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The International Journal of Orthodontia and Oral Surgery

A Monthly Journal Devoted to the Advancement of the Sciences of Orthodontia, Oral Surgery, and Dental and Oral Radiography

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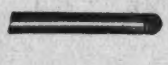

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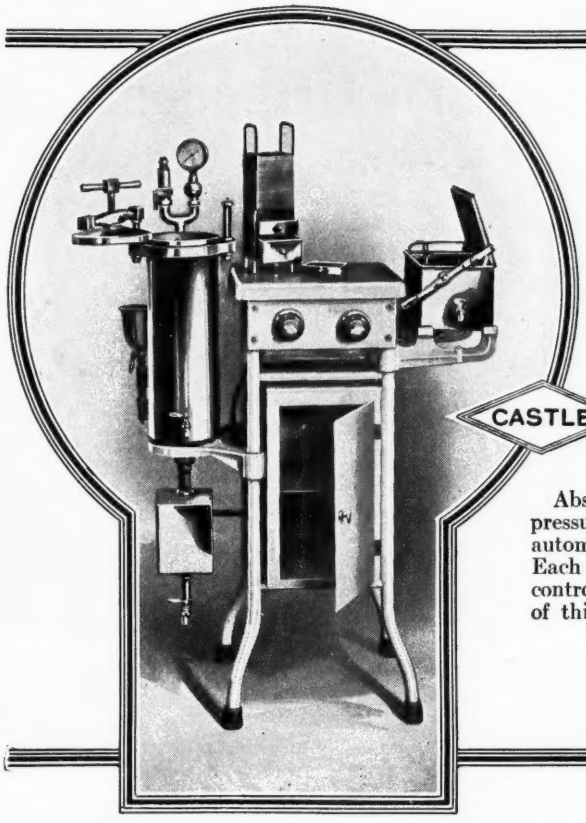

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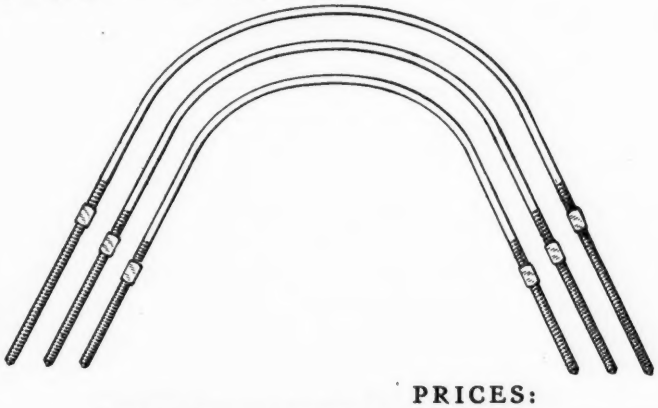

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VOL. VII ST. LOUIS, DECEMBER, 1921 NO. 12

ORIGINAL ARTICLES

ON THE PATHOLOGY AND DIAGNOSIS OF DISTOCLUSION*

BY B. E. LISCHER, ST. LOUIS, MO.

MODERN medicine has definitely demonstrated that practically every disease proceeds from an external cause and presents a specific set of chemical, functional and structural changes from the normal. The persistence of a former view, namely, that disease was often due to internal causes, gave rise to the confusion of disease with affection.

According to Roger,[1] "Disease is a morbid process considered in its entire evolution, from its initial cause to its final consequences; affection, on the other hand, is a morbid process considered in its final manifestations, apart from its cause. Take for instance, a man suffering from typhoid fever. The disease being over, the organism is restored to health. But the restoration is only apparently perfect; modifications persist which, too slight to be perceived, follow, nevertheless, their progressive evolution. Ten, fifteen, twenty years later, new manifestations break out—for example, some disturbances due to heart lesion. By that time the disease is almost forgotten, and, as no intermediate bond connects the actual manifestations with the disease left far behind, considerable difficulty is experienced in tracing the succession—some sort of repugnance to connect this cardiopathy with the long expired typhoid fever. In another case the subject will have been through a number of different diseases, and the physician will be at a loss as to which of them to attribute the new visceral disorder.

"From a philosophical point of view it is essential to reascend to the first disease. From a practical standpoint this inquiry is often useless. Whatever the etiologic conditions may have been, the effect is the same. Organic affections are simply cicatrices; disengaged from the initial cause, they become autonomous and develop on their own account. * * * The etiologic notion

*Read before the American Society of Orthodontists, Atlantic City, N. J., April 27, 1921.

is of no practical importance, but is indispensable to the nosologist who will even refuse to consider the affections of the organs as diseases.

"What is true of the heart is true of all viscera. Their affections take origin from some antecedent cause. For a long time this very simple truth has not been understood because the initial disease is not always easily found out; the visceral derangement may be the first outward manifestation, leading to the belief that it is making its appearance spontaneously.

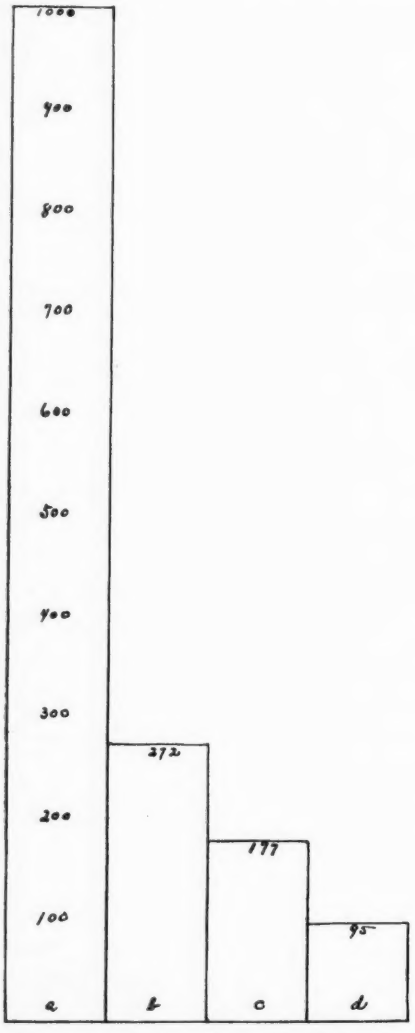


Fig. 1.—Diagram showing frequency of distoclusion in 1000 cases of oral deformity; (a) total number of cases; (b) total number of distoclusions; (c) total number of bilateral distoclusions; (d) total number of unilateral distoclusions.

"Morbid actions and reactions express themselves by functional modifications and structural lesions, which may be recognized during life or discovered only after death. The structural lesions, the study of which constitutes pathologic anatomy, must be considered as the result of functional disturbances; as we are taught in general biology that it is function that creates the organ, so in pathology it is proved that the disturbance of function is responsible for the organic lesion."

Dento-facial deformities constitute a group of abnormalities that arise as a result of some previous disorder and may be regarded as consequences. A first step toward a more intelligent comprehension of their nature is a general outline of their functional disturbances and structural modifications.

In discharging the task assigned to me today, I will attempt a restatement of established facts and present a summary of my experiences with one thousand cases of dento-facial deformity, of which two hundred seventy-two were of the kind under consideration, (Fig. 1).

DEFINITION

During our annual meeting in Excelsior Springs, Mo., 1917, on recommendation of the committee on nomenclature, the Society adopted the term *distoclusion* for all cases of malocclusion of the teeth that are "characterized by a distal or posterior relation of the lower arch to the upper arch." I believe a more exact and comprehensive definition is necessary at this time, and therefore offer the following:

Distoclusion is a dento-facial deformity characterized by a distal, or posterior, relation of the mandibular dental arch to the maxillary dental arch, but without extreme malformation of the jaws. Marked arrest of development, anchylosis or malposition of the mandible, or an anterior shifting of all, or part, of the maxillary arch, may present an apparent distoclusion; but in such cases the distoclusion should be regarded as a complicating symptom, and not as the determining factor that guides us in the selection of a specific term for the deformity.

A distal relation of the mandibular arch may involve both sides, hence the term *bilateral distoclusion* is advisable. When the affection is confined to one side, either right or left, the term *unilateral distoclusion* is employed. All other modifications encountered in this group of deformities and not specifically alluded to in the above definition, may conveniently be expressed by the addition of a descriptive phrase, e.g., bilateral distoclusion complicated by labioversion of the maxillary incisors; unilateral distoclusion complicated by perversion of the maxillary right lateral incisor, etc.

SYNONYMS

A review of the literature reveals the fact that this form of dental anomaly has been recognized by numerous writers, but thus far we have failed to establish any uniform convictions. As early as 1836 Kneisel[2] called attention to malrelations of the dental arches, and divided the various forms of "malposition of the teeth" into *partial* and *complete* anomalies. By the term *partial* he meant malposition of the individual teeth, and he refers to teeth occupying positions labial, mesial and distal to normal. The group of abnormalities embraced under the term *complete* he subdivided into: (a) cases which we recognize as a distal relation of the mandibular arch; (b) cases which we recognize as a mesial relation of the mandibular arch; (c) cases which, he said, presented an "edge to edge" bite.

In 1842, Carabelli[3] suggested a more comprehensive classification and for the first time offered a fairly finished terminology. He also called attention to malrelation of the arches, described the temporomandibular articulation and enumerated the various movements of the mandible. He speaks of a "posterior bite" and suggests the term *mordex retrorsus,* but fails to illustrate a case of what we today call a distoclusion. His plates of mesioclusion and other forms of abnormality are, nevertheless, excellent. Magitot,[4] Iszlai[5] and Sternfeld[6] complete the list of the earlier European writers.

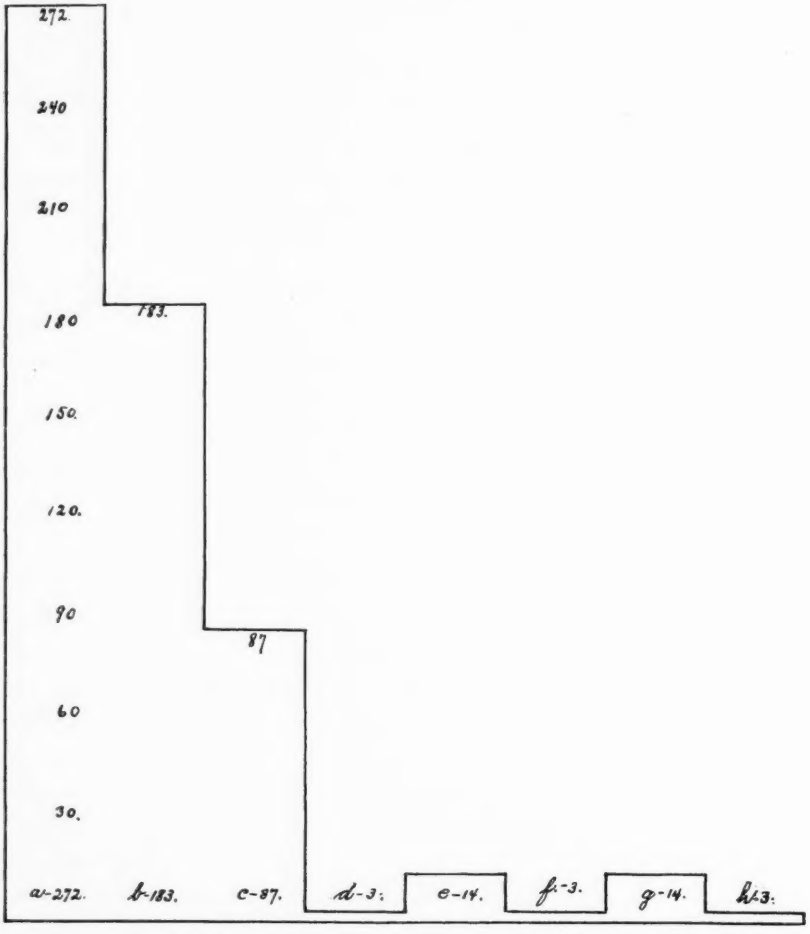


Fig. 2.—Diagram showing frequency of the various anomalies in distoclusion: (a) total number of cases; (b) labioversion of maxillary incisors; (c) linguoversion of maxillary incisors; (d) infraversion of anterior teeth; (e) deficiency of number; (f) redundancy of number; (g) fractures of maxillary incisors; (h) perversions. There was one case complicated by transversion.

Many classifications have been suggested since then, and some were based, at least to some extent, upon the morbid anatomy. Others were largely based upon the treatment to be instituted and were, therefore, fallacious. The more important of the former group were by the following writers: Angle,[7] Welcker,[8] Grevers,[9] Herbst,[10] Zsigmondy,[11] Villain[12] and Colyer.[13]

The term (?) *Class II,* suggested by Angle, gained wide recognition during the last twenty years and was defined by him as follows: "Lower arch

distal to normal in its relation to the upper arch.'' He divided this group into two divisions and two subdivisions as follows:

Division 1.—Bilaterally distal, protruding upper incisors. Primarily, at least, associated with mouth-breathing.

Subdivision.—Unilaterally distal, protruding upper incisors. Primarily, at least, associated with mouth-breathing.

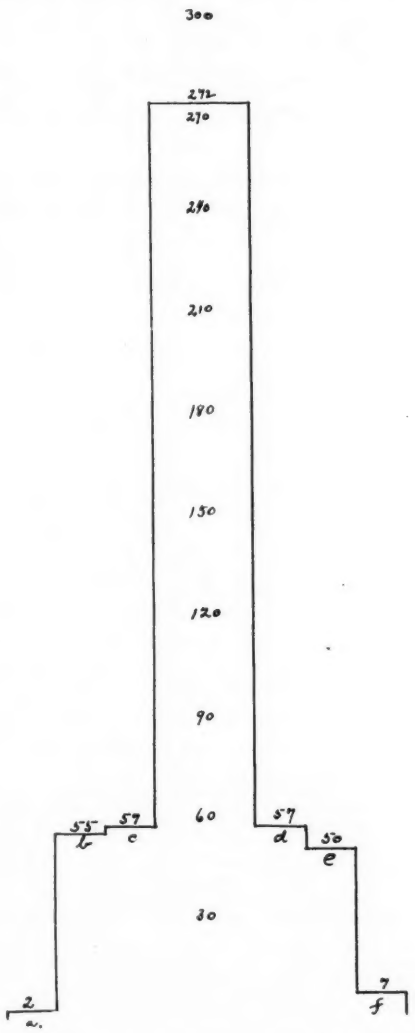


Fig. 3.—Diagram showing frequency of abnormal frenum labium in 272 distoclusions: (a) lower abnormal frena; (b) upper abnormal frena; (c) and (d) total number of cases; (e) with labioversion of the maxillary incisors; (f) with linguoversion of the maxillary incisors.

Division 2.—Bilaterally distal, retruding upper incisors. Normal breathers.

Subdivision.—Unilaterally distal, retruding upper incisors. Normal breathers.

As stated above, the term *distoclusion* (suggested by the writer[14]) has since been adopted by this Society.

FREQUENCY

So far as he has been able to determine, Angle and the writer are the only ones who have published any statistics on the relative frequency of this group of abnormalities. Angle's[15] findings, based upon "several thousand cases," were as follows:

Class II—Division 1, 90 cases; Subdivision 34 cases;
Division 2, 42 cases; Subdivision 100 cases.

This makes a total of two hundred sixty-six.

In my collection of two hundred seventy-two cases of distoclusion in the first thousand, the following dental anomalies occurred (Fig. 2):

Distoclusion complicated by *labioversion* of maxillary incisors:
Bilateral forms 119; Unilateral forms 64.
Distoclusion complicated by *linguoversion* of the maxillary incisors:
Bilateral forms 56; Unilateral forms 31.
Distoclusion complicated by *infraversion* of the anterior teeth:
Bilateral forms 2; Unilateral forms 1.
Distoclusion complicated by *perversion:*
Bilateral forms 0; Unilateral forms 3.
Distoclusion complicated by *transversion:*
Bilateral forms 1; Unilateral forms 0.
Distoclusion complicated by *deficiency of number:*
Bilateral forms 8; Unilateral forms 6.
Distoclusion complicated by *redundancy of number:*
Bilateral forms 0; Unilateral forms 3.
Distoclusion complicated by *abnormal frena of the lips:*
Bilateral forms 38; Unilateral forms 19; with one abnormal frenum of the lower lip in each of these groups. Fig. 3.

But these figures are based upon the findings in *abnormal* dentures, hence it would be more instructive to ascertain the relative frequency of these forms in a thousand individuals taken at random. It is safe to assume that some would undoubtedly present normal dentures, and the percentages would thus be materially lowered.

AGE

The various ages of my cases are presented in the chart (Fig. 4). From this it will be seen that the greatest number of patients applying for treatment of distoclusion were nine years of age. But this again is an inaccurate index because it, too, ought to be based upon one thousand individuals taken at random; or, better still, an even number (say 100) for each year from 3 to 18. This would give us the relative frequency at any given age, and a probable clue as to whether distoclusion is in a measure a self-corrective abnormality. Such a statistical study of a span of 15 years, beginning with the completion of eruption of the temporary teeth to the completion of eruption of

the permanent teeth, would give us an intimation of the earliest stages of this deformity, as well as its probable decline as the individual approaches maturity.

SEX

In my 272 cases there were 109 males and 163 females (Fig. 5). These figures are of no practical value and the probable "influence" of sex (if any) can only be determined by an extended statistical study as outlined above.

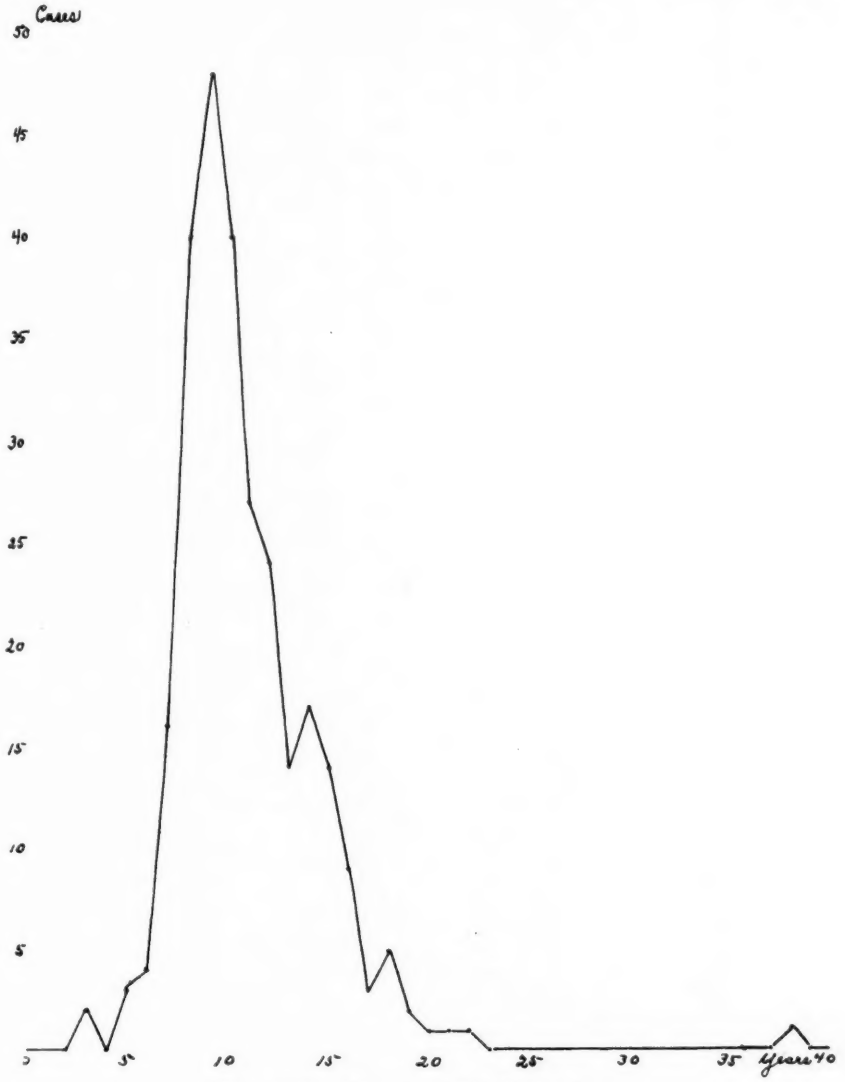


Fig. 4.—Age diagram of 272 distoclusions.

HEREDITY

As a causative factor heredity is not as readily accepted as formerly, and for very good reasons; but in my opinion we must continue to regard it as of very great importance, because it "repeats strength or weakness, good or ill, with like difference." (Jordan and Kellogg.[16])

One phase of this vast theme stands out very prominently, namely, *all*

dental research thus far conducted is entirely inadequate to warrant any bold denial of the probable "influence" of heredity in the causation of dento-facial deformities. Many anomalies of other organs of the body (notably the eyes) are largely congenital and frequently transmitted from generation to generation. Surely, the teeth and jaws are not exempt from a process which undoubtedly exercises an influence over such maldevelopments.

"Our present plight seems to be exactly this, we cannot explain to any

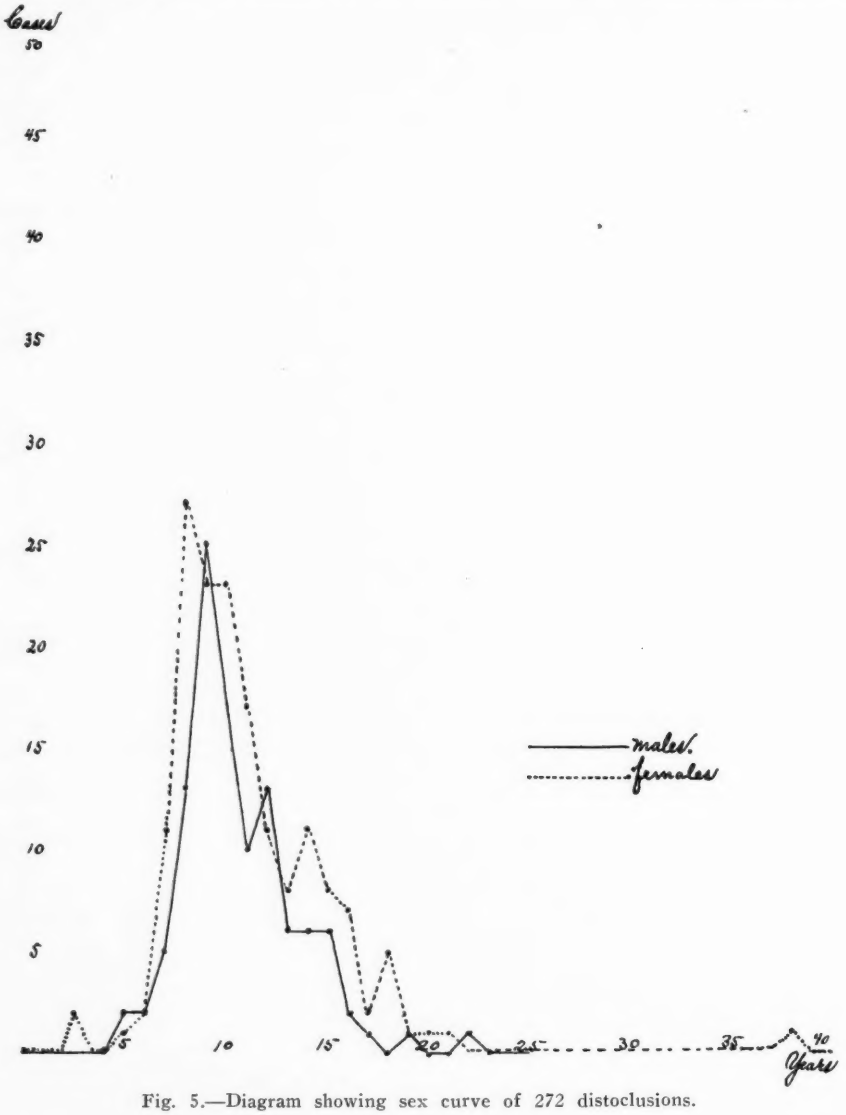


Fig. 5.—Diagram showing sex curve of 272 distoclusions.

general satisfaction" all the causes of malocclusion of the teeth without the help of some hereditary factors; "and on the other hand, we cannot assume the actuality of any such factor in the light of our present knowledge of heredity."

FUNCTIONAL DISTURBANCES

A very common functional disturbance in distoclusion, one that is easily recognized, is that of abnormal breathing, or mouth breathing (Fig. 6). Lay-

men generally regard the nose as the organ of the sense of smell, though its principal function is to serve as the intake of respiration. In normal, or nasal, breathing it cleanses the dustladen air we breath by means of the *vibrissae* and the secretions, the latter exercising a bactericidal influence on inhaled bacteria. Besides warming the air we breathe, the nose also increases its humidity. Normal breathing is a very important function of the living body and we now know that long continued mouth breathing affects the individual both locally and constitutionally, and its consequences may be carried into late life.

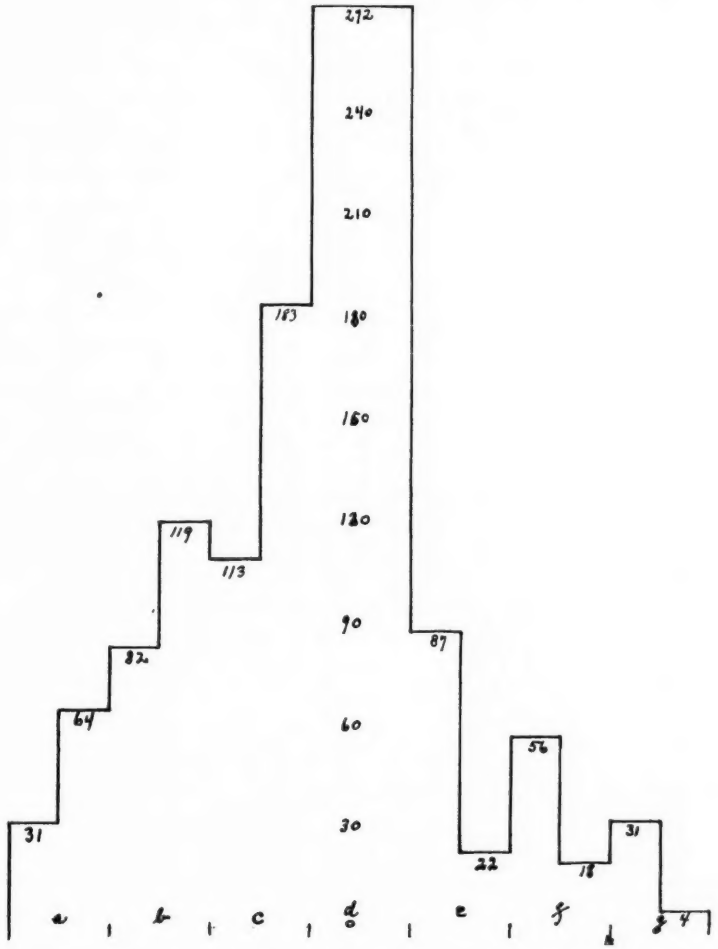


Fig. 6.—Frequency polygon of nasal obstruction in 272 distoclusions; (a) of 64 unilateral distoclusions with labioversion of the maxillary incisors, 31 gave a history of nasal obstruction; (b) of 119 bilateral distoclusions complicated by labioversion, 82 gave a history of nasal obstruction; (c) of 272 distoclusions 183 were complicated by labioversion, and of these 113 gave a history of nasal obstruction; (d) represents the total number of cases; (e) 87 cases were complicated by linguoversion, and only 22 of these gave a history of nasal obstruction; (f) represents the bilateral forms with, and without, nasal obstruction, and (g) the unilateral forms.

Mouth breathing causes a dry feeling in the throat which causes quick movements, grinding of the teeth and *pavor nocturna* (night mares) in children. *Enuresis nocturna* (bed-wetting) has also been attributed to mouth breathing, and cases are on record where adenectomy has brought about a cure. Loss of function in the facial muscles about the nose and lips are com-

mon, and the upper lip is frequently too short. Arrest of development in the middle third of the face is readily recognized. The lips chap easily, their mucous membranes become lacerated and the gums are predisposed to inflammation. The tongue becomes dry, insalivation is incomplete and the function of mastication is interfered with, because the mouth breather must gasp for air. Food is less appetizing and the habit of excessive drinking of liquids during meals is often acquired. This, as Czerny has pointed out, may lead to heart and kidney lesions.

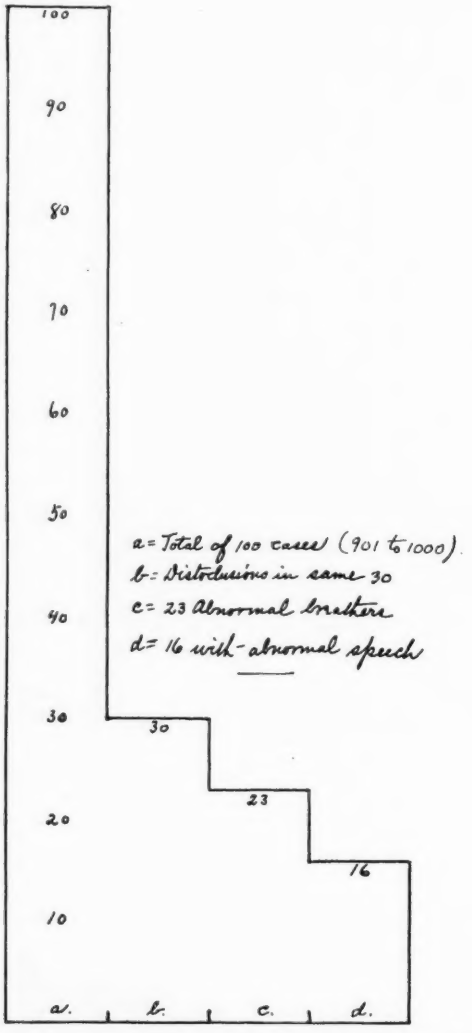


Fig. 7.—Diagram showing relative frequency of abnormal breathing and marked abnormal speech in distoclusion; (a) total number of 100 cases; (b) 30 distoclusions; (c) 23 abnormal breathers; (d) 16 with marked abnormal speech.

The dust-laden air inhaled directly through the mouth may cause inflammation of the tonsils, with bronchial and glandular involvement. Deformities of the thorax, inspissation of the apex of the lung, especially the right lung (Kroenig), are common. The circulation at the base of the skull and the emptying of the ethmoidal veins may even be disturbed.

Thus anemia, depression, dullness, dizziness, lack of concentration, inat-

tention, feeble-mindedness, headaches, the vacant stare and subnormal weight and stature are recognized as complications, and known as the symptom complex of Guye, or *aprosexia.*

The unequal muscular pressure in the mouth breather gives us the narrow, V-shaped maxillary dental arch with high palate. The mandible is held in place in normal breathers by muscular pressure and atmospheric pressure (Metzger, Herbst). In mouth breathing it drops down and back and consequently suffers in development, both as to size and form. According to Bloch, the fibers of the muscles of mastication are stretched during chronic mouth breathing and their strength is consequently diminished. The depressors of the mandible are said to hypertrophy.

In normal breathing we find a *positive* air pressure in the nose and a *negative* pressure in the mouth. In mouth breathing we find the reverse condition and hence an abnormal balance between air, muscle, tongue and masticatory pressure (Misch). Körbitz considers the influence of the tongue as most important.

Another functional disturbance frequently met with in dento-facial deformities, and one which is quite common in distoclusion, is that known as *rhinolalia* (Gutzmann). A normal resonance gives to the human voice its carrying qualities and when this is impaired (as it always is in mouth breathers) speech and song are seriously affected (Fig. 7).

Certain sounds are formed by forcing the air unhindered through the nose. In mouth breathers, the resonants: *m*—formed by closure of the lips; *n*—formed by a posterior tongue lock; are pronounced *b, d, g,* (Misch). Stammering is also met with.

Schroeder-Benseler maintains that normal nasal breathing is dependent on an ample width of the nasal floor, and this is dependent on the width of the maxillary dental arch, which, in his opinion, is definitely determined between the third and fourth years, and for which he gives the following measurements:

iii/iii - 25 mm.
iv/iv - 30 mm.
v/v - 35 mm.
6/6 - 40 mm.
7/7 - 45 mm.
8/8 - 50 mm.

Landsberger also maintains that the width of the maxilla is dependent on the growth and development of the dental arch, because without teeth there is no development of the alveolar structures.

According to Misch,[17] Zsigmondy and Körner differ with Schroeder-Benseler and maintain that growth continues beyond the age he mentions.

Talbot, Siebenmann, Grossheinz, Fränkel and many others do not regard mouth breathing as a factor of great moment. Siebenmann and his pupils, in an extensive series of measurements, have tried to show the correlation between maxillary width and facial and head width. Accordingly, the former

is predetermined and in harmony with biologic law, and individuals may thus be grouped into the broad-faced, and long and narrow faced types. The former are called *chamaeprosopic* and are said to have broad, flat palates, termed *platystaphylinia.* The latter are called *leptoprosopic* and present high, narrow palates, *leptostaphylinia.* They regard palatal variations between normal and abnormal breathers as negligible and trace the causes to heredity and racial characteristics. Buser, Bloch, Frese, Halle and others have disputed these contentions, but regard a leptoproscopic cranial form as a predisposing factor (Misch).

Sundry variations and modifications of tooth eruption are now definitely recognized. The investigations of Cartwright, Dietlein and Röse, whose observations embraced 50,000 individuals, have shown racial, social or economic, and sexual variations. Thus eruption occurs earlier in the well to do and is retarded in the poor; eruption of temporary teeth before birth is rare; the temporary teeth of females average 31 days earlier than the corresponding teeth in males; the permanent teeth exhibit a similar secondary sexual variation amounting to 4½ months. The $\frac{6/6}{6/6}$ vary least and $\frac{3/3}{3/3}$ most in their eruption, while $\frac{\text{iv/iv}}{\text{iv/iv}}$ and $\frac{5/5}{5/5}$ frequently exhibit a tendency to partial eruption. Rickets and cretinism usually retard eruption, whereas syphilis hastens the process. Retarded eruption of 3/3 is frequently observed, and may be due to premature loss or prolonged retention of the temporary teeth. Difficult and tardy eruption is also quite common in $\frac{8/8.}{8/8.}$ Faulty diet, disuse, caries, pulpitis, pericementitis and ostitis, during the period of the temporary dentition (i.e., from three to twelve years), undoubtedly modify the eruption of the permanent teeth, and very largely because they seriously disturb the normal functions of the teeth.

A statistical study of eruption in dento-facial deformities is desirable, so that we may know the behavior of teeth in this respect, and whether it differs appreciably from eruption in normal dentures. The writer has recorded in his office files the eruption of every tooth in all of his cases, but the time was too short to include a summary of his distoclusion cases in this paper. This is therefore postponed to some future report.

STRUCTURAL LESIONS

The most common local lesion in all cases of oral deformity is malposition of the teeth. It is rarely limited to only one, or two, teeth and usually involves several, or all, of the teeth. This causes anomalies of arch form and malocclusion, or abnormal antagonism. If we now recall that teeth do not come down into pre-existing sockets during their eruption, but complete their calcification and socket formation after they assume their anatomic relations in the mouth, we can readily understand why the alveoli surrounding malposed teeth suffer from abnormal development.

Malocclusion always means abnormal function and this invariably leads

to structural lesions. It may be stated axiomatically that only a normal mouth can perform normal functions; and by a normal mouth we mean a mouth of normal architectonic form, as well as one free from disease.

A priori, we therefore expect to find caries of the enamel and dentine in a large percentage of oral deformities. Of the last one hundred cases of my first thousand, a very complete record is on file in my office. Of this

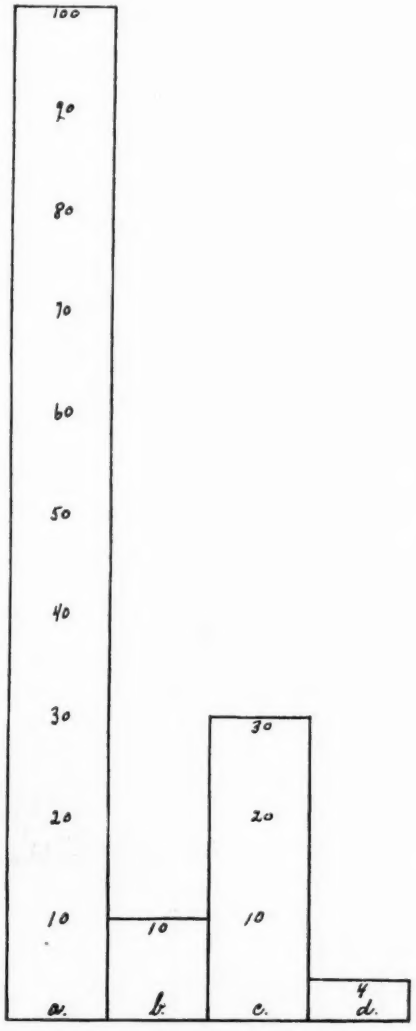


Fig. 8.—Diagram showing relative immunity to caries; (a) total number of 100 cases; (b) number immune to caries 10; (c) total number of distoclusions 30; (d) number immune to caries 4.

number thirty were distoclusions. Only four of these were found free from caries on first consultation (Fig. 8).

Obviously, if these lesions are neglected, pulp infection and all its sequelæ are sure to follow. These aggravate masticatory function and the lesions thus rapidly extend beyond the immediate alveoli.

Of the thirty cases referred to above, one presented hyperplastic enamel, two malacotic enamel, and twenty-seven had teeth of sclerotic structure; but most of these had minor restorations. This classification is entirely empirical,

but very convenient clinically. The importance of this subject certainly warrants extensive research.

Simple and chronic gingivitis are frequently met with, and are usually due to a faulty diet and faulty oral hygiene. Hypertrophic gingivitis has been found in two cases, and one of these was undoubtedly due to the malocclusion.

Pericementitis in all its forms, namely, simple gingivo-pericementitis, gingivo-osteo-pericementitis, proliferative pericementitis of the suppurative and nonsuppurative varieties, and atrophic pericementitis, have all been observed in the mouths of the older patients. These rendered the prognosis so very unfavorable that treatment was deemed inadvisable.

Deformities of the palate and arrest of development of the nasal passages

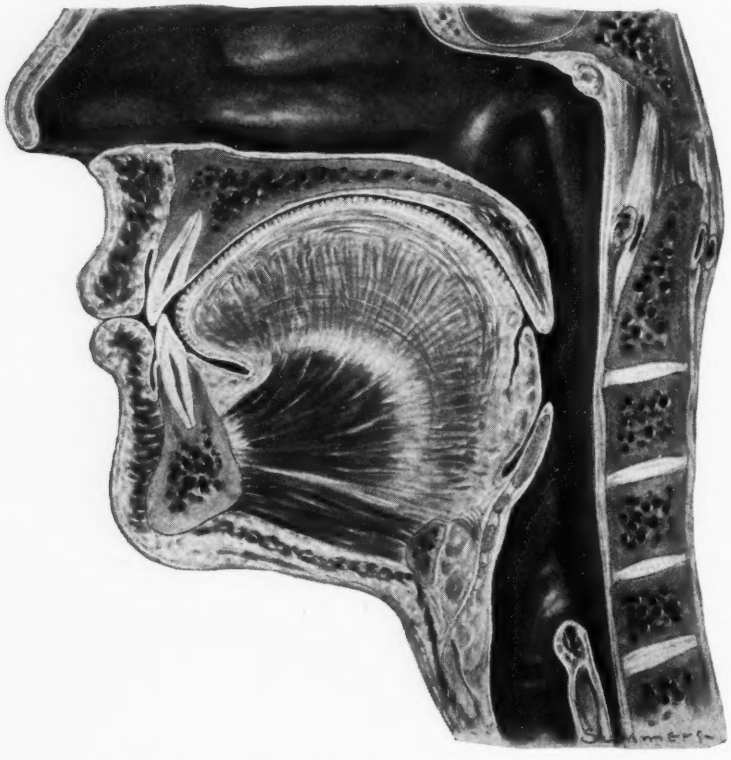


Fig. 9.—Section through a normal mouth showing relation of the tongue to the palate, and of the lips and teeth.

have already been mentioned (Figs. 9, 10, 11, and 12). The growth of the body of the mandible is frequently affected in distoclusions, and in some instances the rami, condyloid processes and even the glenoid cavity are involved to such an extent that more accurate methods of diagnosis will ultimately remove many cases from this group.

FACIAL MODIFICATIONS

Variations of the facial features, and of the jaws and teeth, have long constituted a subject of compelling interest to students of physical anthropology. Not infrequently, cases of oral and facial deformity have crept into their

reports as *variations.* Dentists and orthodontists have, on the other hand, looked rather lightly upon the *modifications* of these structures, and have almost unanimously interpreted oral deformities on an *exclusive occlusal basis.*

The facial modifications of distoclusion, as of every other kind of oral

Fig. 10.—Cross section through a normal tooth.

Fig. 11.—Section through an abnormal mouth, showing malrelations of the tongue, palate, lips and teeth.

deformity, are many and various; and the facts disclosed by a more intensive study do not justify the accepted narrow viewpoint, but demand additional methods, or aids, of diagnosis and description. The writer has long been convinced that extensive researches are necessary before final conclusions are permissible.

Heretofore, we have grouped them into the labioversion (mouth breathers) and linguoversion (normal breathers) divisions, and have ignored the major osseus lesions, and the infraversion form, Figs. 13 to 19. We have been content to remark, that in the unilateral forms the distoclusions of the facial

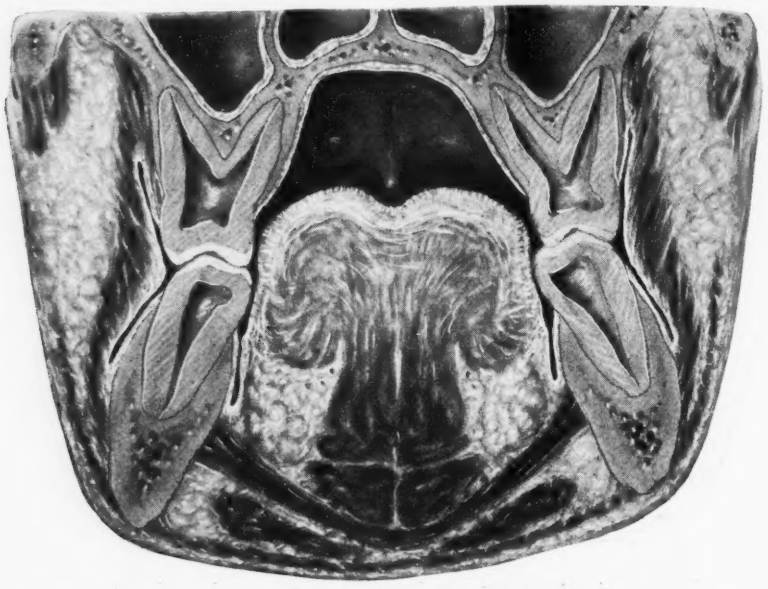


Fig. 12.—Cross section through an abnormal mouth.

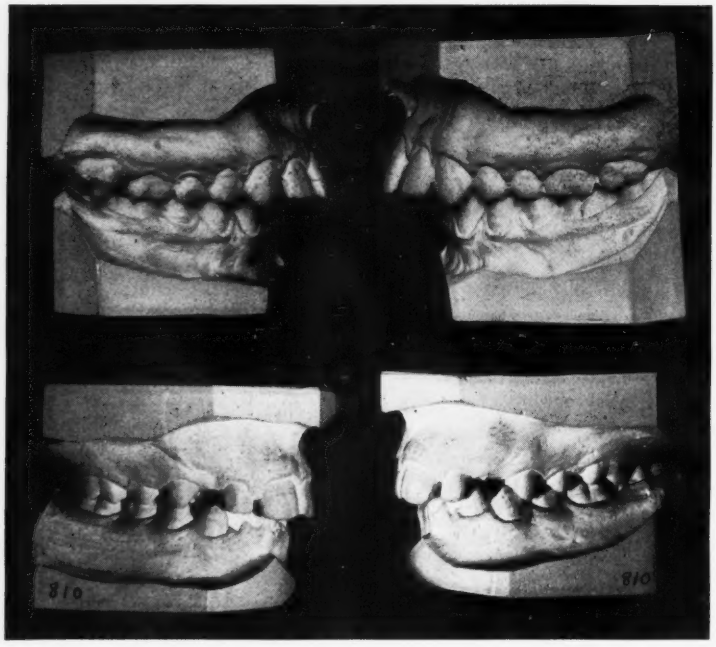


Fig. 13.—Bilateral and unilateral distoclusion complicated by labioversion of the maxillary incisors.

lines were less severe than in the bilateral forms. That this is an inadequate method is clear to any unbiased observer. One looks in vain in our standard textbooks for a comprehensive description of the pathology and facial modifications of any type of oral deformity. On the other hand, if we re-read the

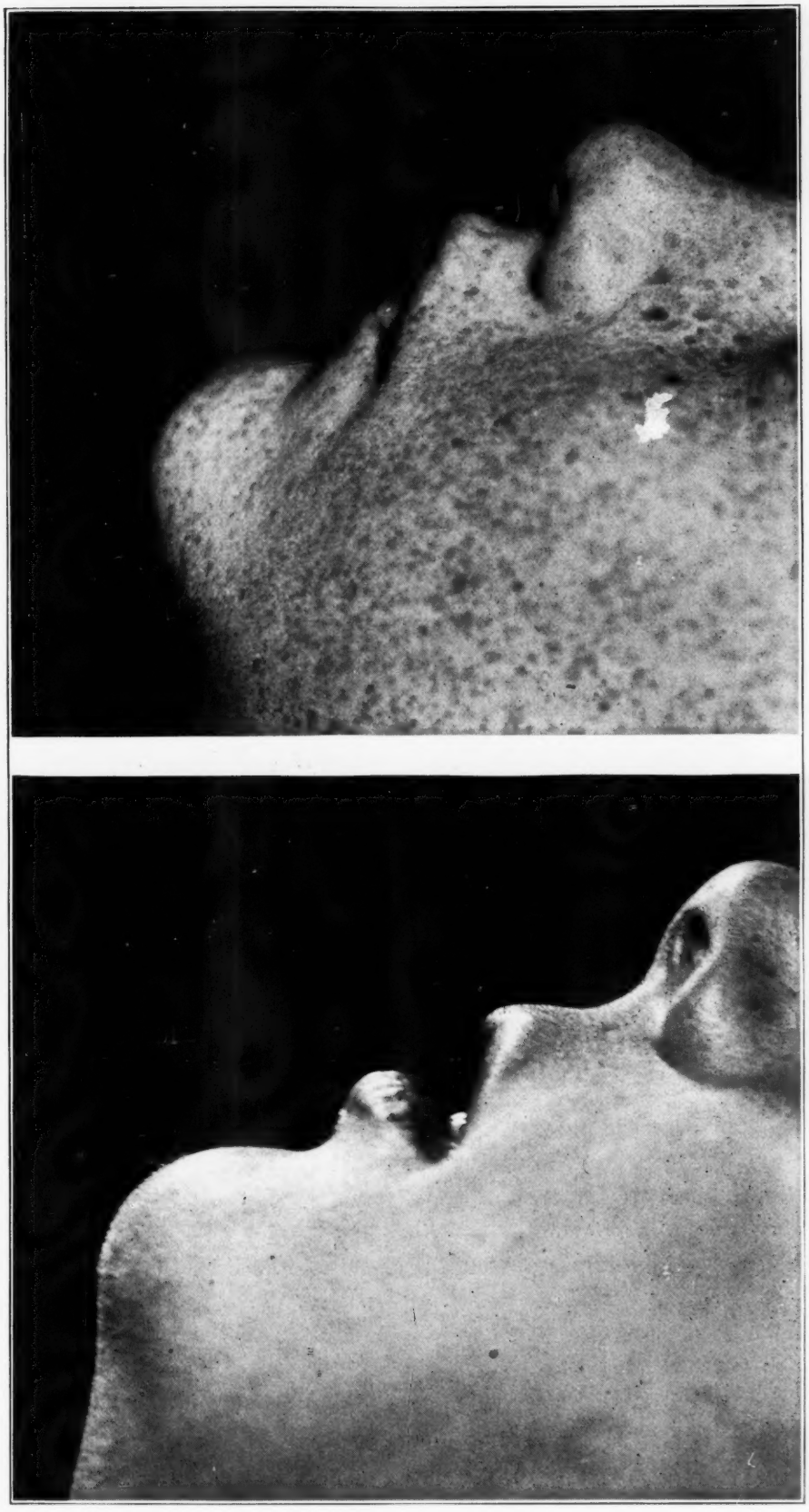


Fig. 14.—Typical facial modifications of bilateral and unilateral distoclusion complicated by labioversion. (Life size.)

chapters on treatment we frequently run across statements that are serious admissions, and that are of great value to the student of pathology. For example: "the lower jaw diminished in size and distal in relation"; or, "It seems reasonable to believe that the mandible is arrested in development"; or, "which would also prevent the normal growth and lengthening of the jaw," etc., appear in one paragraph. (Angle, pp. *449.*)

Temporarily, the writer suggests dividing the facial modifications into *minor* and *major* deformities. The minor group might include all normal and abnormal breathers who present only *malrelation* and *malfunction* of the lips, with a normal amount of lip tissue and only slight arrest of development of the underlying osseus structures. In the major group more extreme cases are found, namely, those with pronounced malposition of the anterior teeth com-

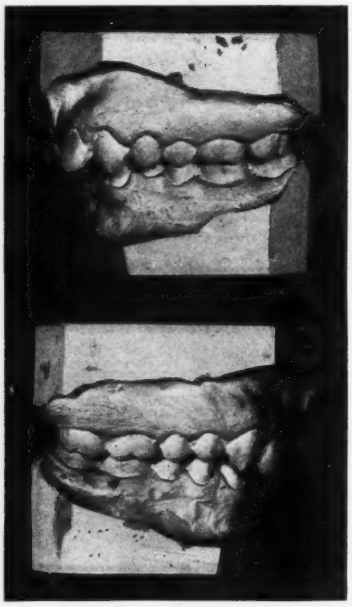


Fig. 15.—Bilateral distoclusion complicated by linguoversion of the maxillary central incisors.

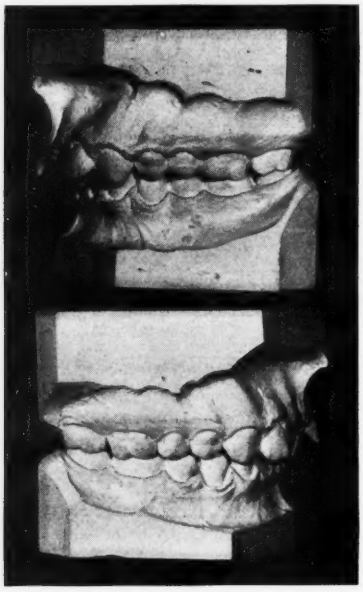


Fig. 16.—Unilateral distoclusion complicated by linguoversion of the maxillary central incisors.

plicated by extreme and prolonged malfunction of the lips and, therefore, marked structural changes. The underlying bony structures are also involved to a greater degree and, in the course of time, as our diagnostic methods become more accurate, some of these cases will undoubtedly be recognized as *micromandibular* and *mandibular retroversion* deformities.

Let us briefly analyze a group of so-called bilateral distoclusions, complicated by labioversion of the maxillary incisors. Time and space forbid a detailed analysis of other forms.

Fig. 20 shows two profiles exhibiting malrelation of the lips, with normal lip function and structure. They are normal breathers in spite of the labioversion of their incisors. *A* is a female eleven years of age who had adenoids and tonsils removed at ten years of age. She is 58 inches in height, weighs 85 pounds, has a mesocephalic head type, and artificial feeding was begun

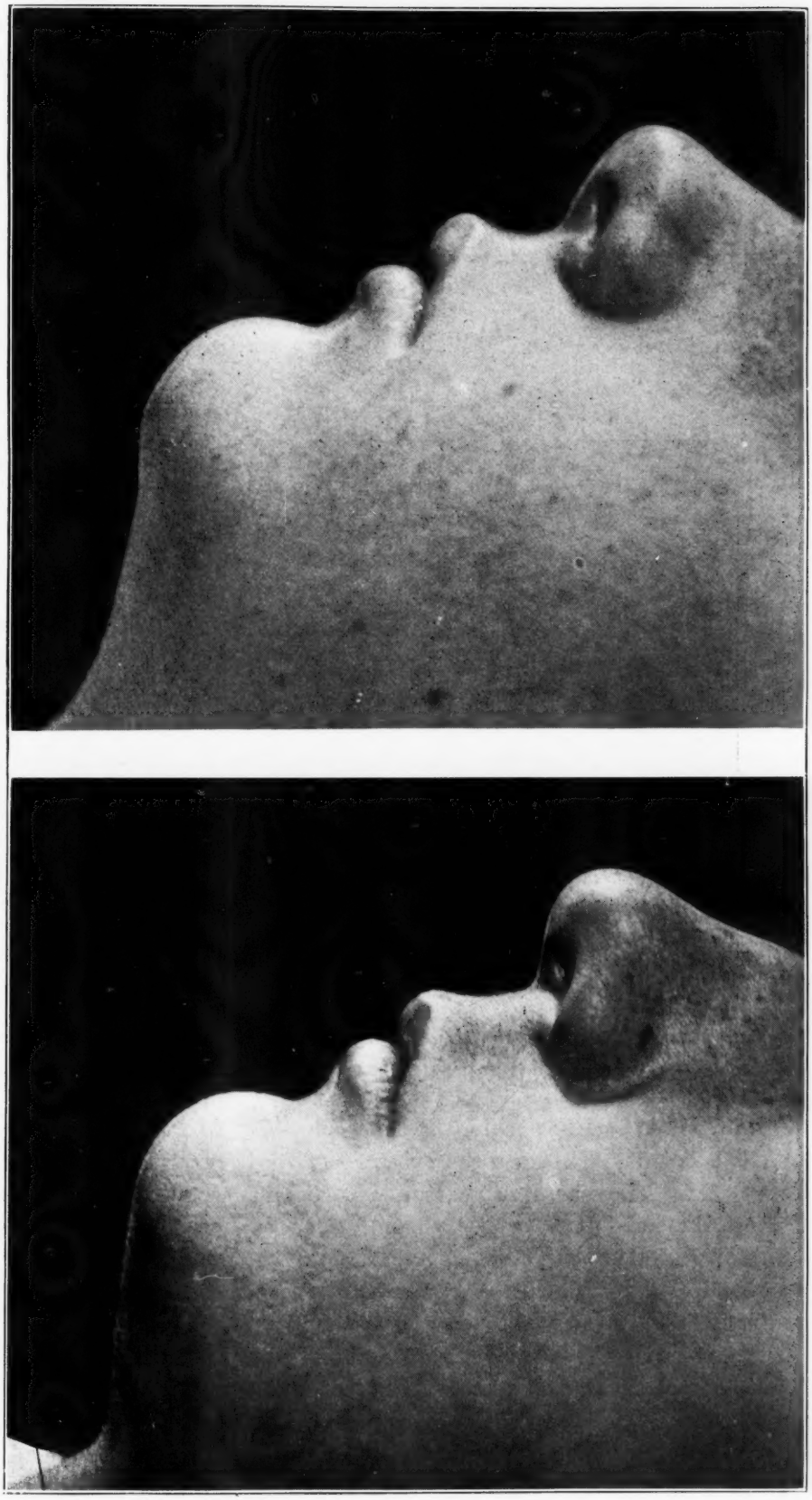


Fig. 17.—Typical facial modifications of bilateral and unilateral distoclusion complicated by linguoversion. (Life size.)

after the seventh month. Her parents have normal dentures. *B* is a male of twelve years, who had a mastoid operation at seven years, is 65 inches in height, weighs 119 pounds, has a mesocephalic head type and artificial feeding was begun after 6 months. His parents also have normal dentures. Fig. 21 shows models of their dentures made at the time their photographs were taken. In Fig. 6 (C) we note 183 cases with the same type of denture (i.e., labioversion) and only 113 gave a history of nasal obstruction. Thus, 70 patients of this group gave a negative nasal history and were normal breathers in spite of the labioversion complication.

In Fig. 22, we note two profiles exhibiting malfunction of the lips with a marked tendency toward abnormal development of these tissues and their underlying bony structures. They were normal breathers but gave the fol-

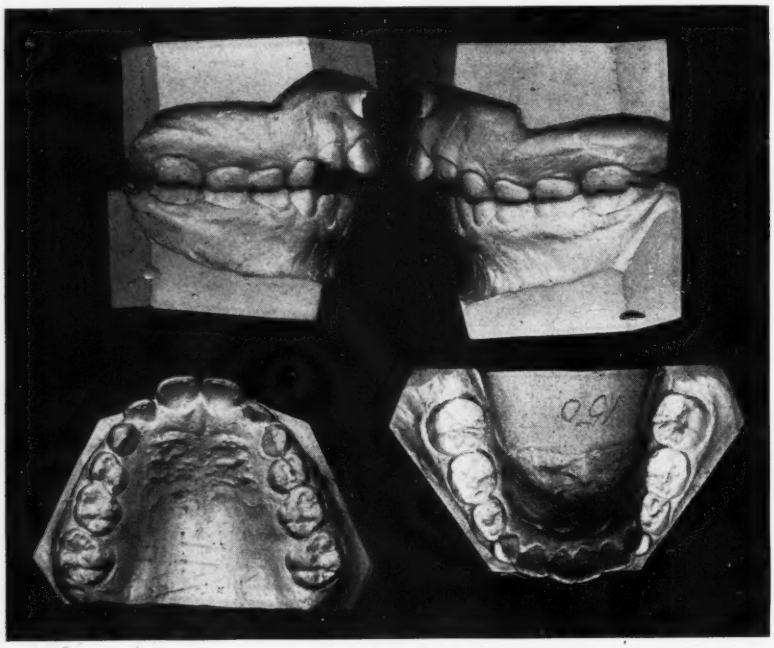


Fig. 18.—Bilateral distoclusion complicated by labio-infraversion of the maxillary incisors.

lowing histories: *A* is a male of thirteen years, of mesocephalic head type, height 61 inches, weight 95 pounds, whose parents have normal dentures and who has had no operation for nasal obstruction. (No record of feeding during infancy.) *B* is a boy of nine years, height 55 inches, weight 69 pounds, of dolichocephalic head type, whose parents have malocclusions. A rhinologic examination revealed only a slight hypertrophy of the right upper turbinate. He was bottle fed from birth, is extremely nervous, has diabetes and bites his lower lip. Their dental models are shown in Fig. 23.

Fig. 24 presents two abnormal breathers with consequent abnormal lip function, but normal lip structure. *A* is a boy of eight years, height 52 inches, weight 69 pounds, dolichocephalic head type, who was fed on the bottle from birth. He suffered an attack of bronchitis during infancy and had adenoids and tonsils removed at two years of age. His mother and two older brothers

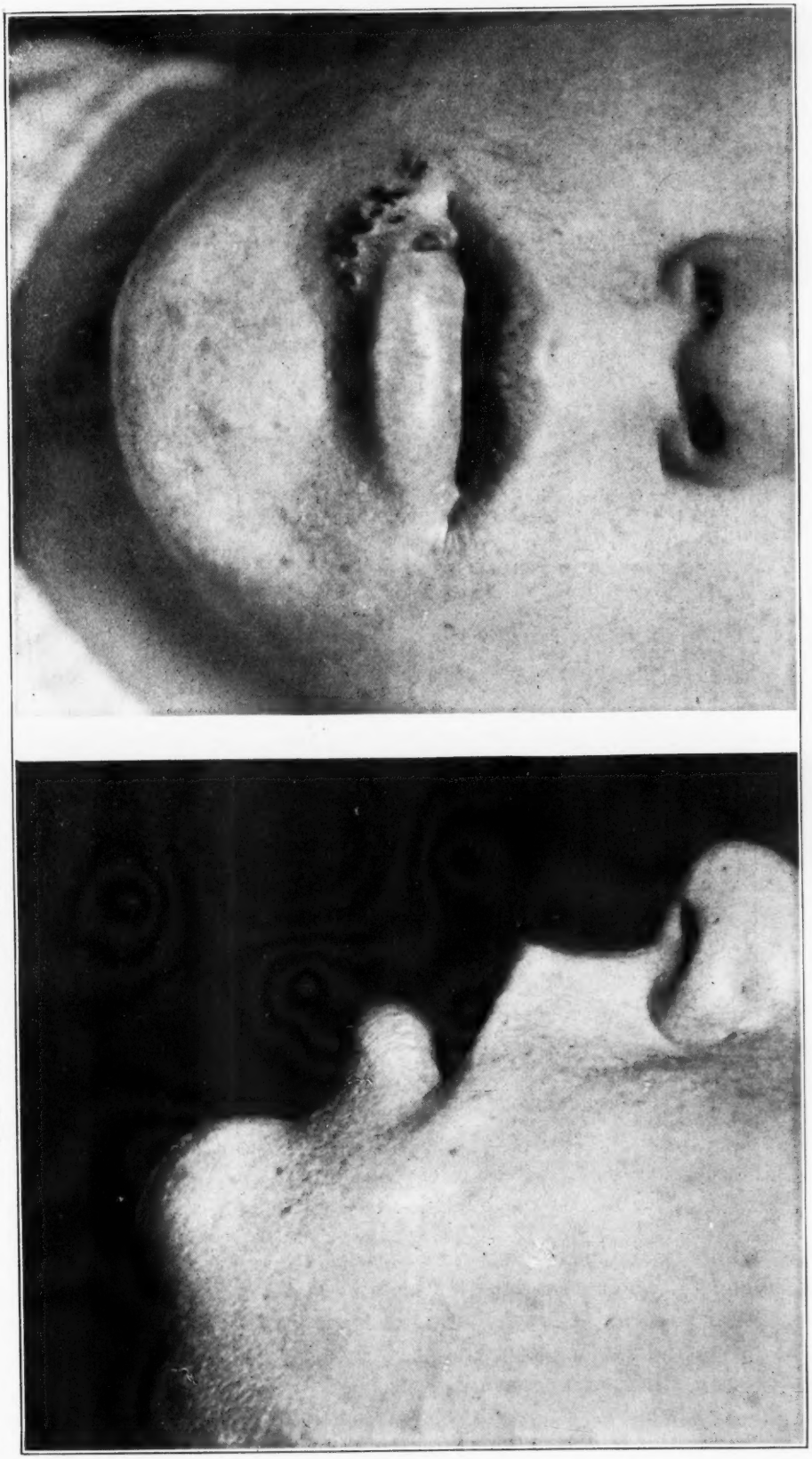
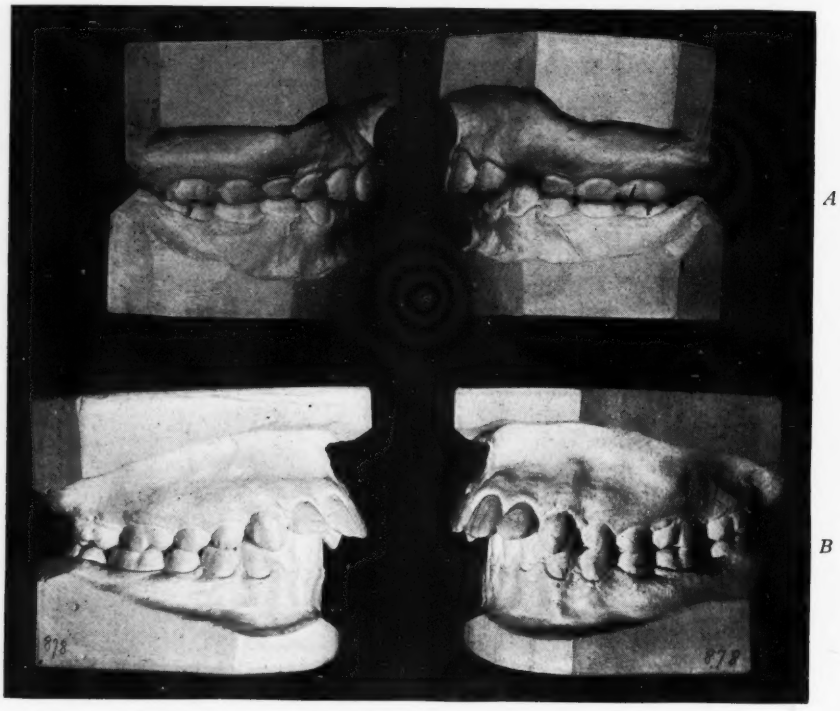


Fig. 19.—Typical facial modification of distoclusion complicated by infraversion. (Life size.)

were treated for malocclusion, the father having a normal denture. *B* is a male of eleven years, who suffered an attack of bronchitis during infancy and had adenoids and tonsils removed at four years, height 54 inches, weight 75 pounds, natural feeding during infancy, mother has normal teeth and father has malocclusion. His head is of dolichocephalic type. The dental models of these two boys are shown in Fig. 25.

A *B*

Fig. 20.—Minor facial modifications found in distoclusion: *A* is a female, age 11 years; and *B* a male, age 12 years. They show *malrelation* of the lips, but normal lip structure. (One-fourth life size.)



A

B

Fig. 21.—Dental models of cases shown in Fig. 20.

Two abnormal breathers with abnormal lip development are shown in Figs. 26 and 27. Abnormal function has undoubtedly caused this maldevelopment. Their histories are as follows: *A* is eleven years old, height 67 inches, weight 160 pounds, dolichocephalic head type, artificial feeding entirely, and he suffered an attack of pneumonia some years prior to the time that his teeth were placed under treatment. (Note prolonged retention of $\overline{I/I}$ and deficiency of number in $\overline{1/1}$.) His father has a normal denture and mother has

a malocclusion. *B* is nine years of age, height 54 inches, weight 70 pounds, had bronchitis at 10 months, and after an attack of otitis media had adenoids and tonsils removed. After continued mouth breathing the adenoids and tonsils were removed a second time, but he still suffers from mouth breathing and sinus trouble. He was bottle fed. His father has normal teeth and mother has malocclusion.

In Fig. 28 we note abnormal lip function and marked arrest of develop-

A *B*

Fig. 22.—Malfunction of the lips tending toward malformation of their structure, but normal breathers. *A* is a male of 13 years; *B* is a male of 9 years. (One-fourth life size.)

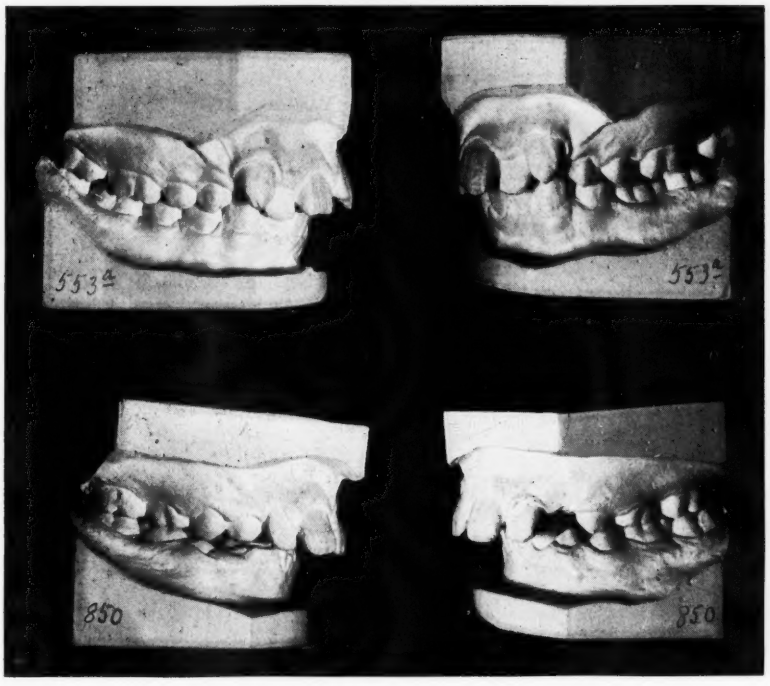


Fig. 23.—Dental models of cases shown in Fig. 22.

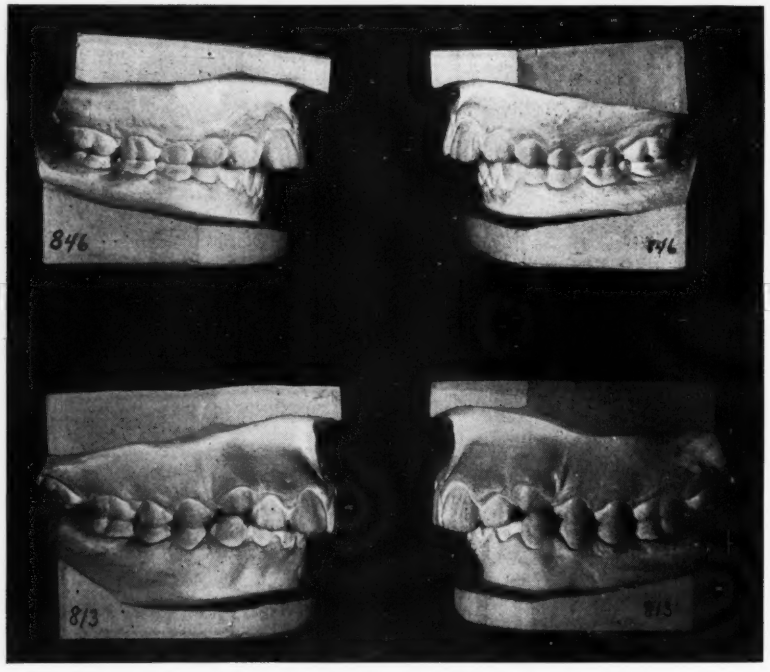
ment of the upper lip. The labioversion of the maxillary incisors is extreme and the bilateral distoclusion complete and pronounced (Fig. 29). Notwithstanding this anomalous denture, there is a well-developed chin present, denoting normal mandibular development. The relation of the mandibular dental arch to this mandible is undoubtedly distal, or posterior, and the case is a true distoclusion of advanced type, the patient being eighteen years old. The nasal history of the patient is negative, but she sucked her thumb for

several years. However, her older sister was also addicted to this habit and has a normal denture. The head type is dolichocephalic, the patient's height is 65 inches, weight 115 pounds, and she was breast fed. The father had normal teeth but is now edentulous. The mother has a normal denture.

Fig. 30 shows the photographs of a girl eleven years old, with mesocephalic head type, height 57 inches, weight 75 pounds, who has had recurrent attacks of rhinitis, but no operation for nasal obstruction. Her mother and younger brother have malocclusions, and the father has a normal denture.

A *B*

Fig. 24.—Abnormal lip function and mouthbreathing, but normal lip structure. *A* is a boy of 8 years, and B a boy of 11 years. (One-fourth life size.)



A

B

Fig. 25.—Dental models of cases shown in Fig. 24.

The dental models of this case are shown in Fig. 31. The important facial features are the short upper lip and poorly developed mental eminence of the mandible.

Fig. 32 shows another girl of eleven years, height 59 inches, weight 88 pounds, with brachycephalic head type. She was fed artificially during infancy, had bronchitis, and adenoids and tonsils were removed at ten years. Mother has malocclusion and father normal teeth. The face presents abun-

dant length, longitudinally, especially in the mandibular area, but the mandible is too short horizontally. This patient is still under treatment and it is hoped that the development and eruption of the mandibular third molars will promote mandibular growth. The dental models are shown in Fig. 33.

That the rami are at times involved is evident to all experienced observers. Fig. 34 shows the facial views of a boy ten years old, of mesocephalic head

A *B*

Fig. 26.—Mouthbreathers with abnormal lip function and structure. *A* is a boy of 11 years, and *B* is a boy of 9 years. (One-fourth life size.)

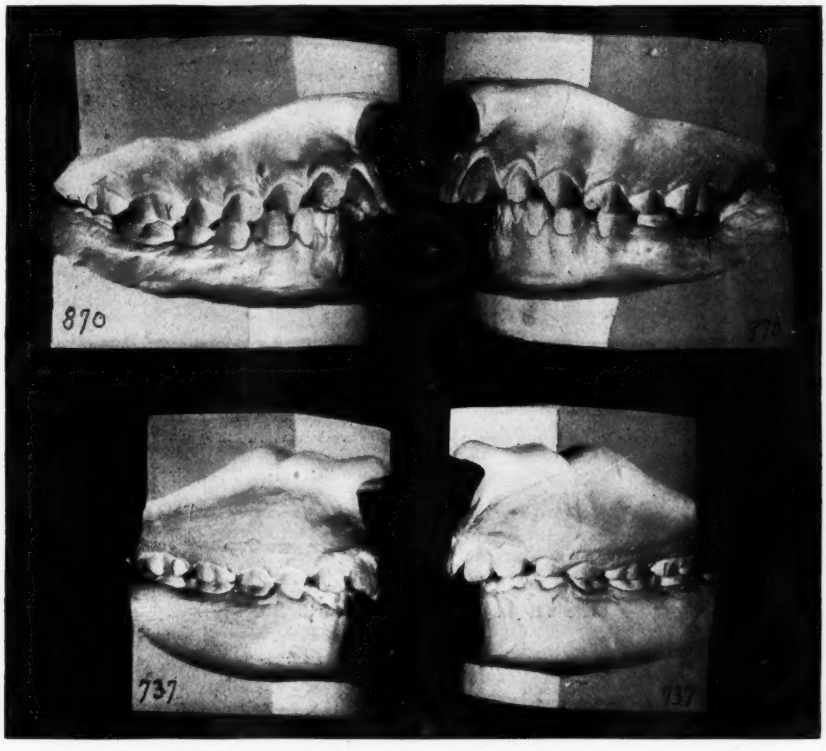


Fig. 27.—Dental models of cases shown in Fig. 26.

type, with a history of artificial nursing, and adenoids and tonsils removed at nine years. He is a normal breather, however, and the distoclusion and its complicating labioversion are not extreme. A marked malrelation of the lower lip is readily recognized, as well as the pronounced deficiency of the mentum in two dimensions. His height is 57 inches, weight 84 pounds, and his mother and younger brother have malocclusions. The dental models are shown in Fig. 35.

But the most difficult form which the writer has ever encountered is shown in Fig. 36. The mentum, body, rami and angles of the mandible are all involved and exhibit marked arrest of development. Other cases like this

A *B*

Fig. 28.—Major facial modification in distoclusion. Note marked arrest of development of the upper lip and normal mandibular development in the region of the chin. Female, age 18. (One-fourth life size.)

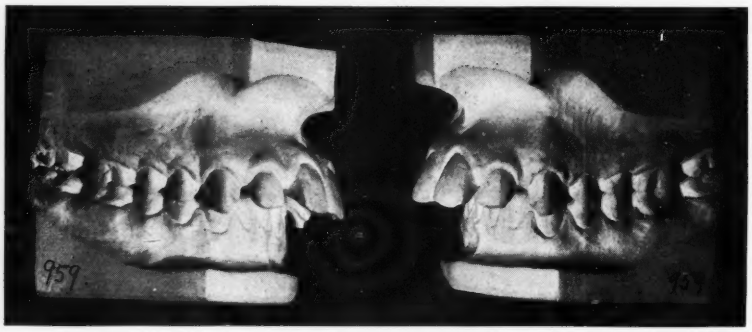


Fig. 29.—Dental models of Fig. 28.

A *B*

Fig. 30.—Abnormal nasal and lip function complicated by deficiency in mental eminence of the mandible. Female 11 years old. (One-fourth life size.)

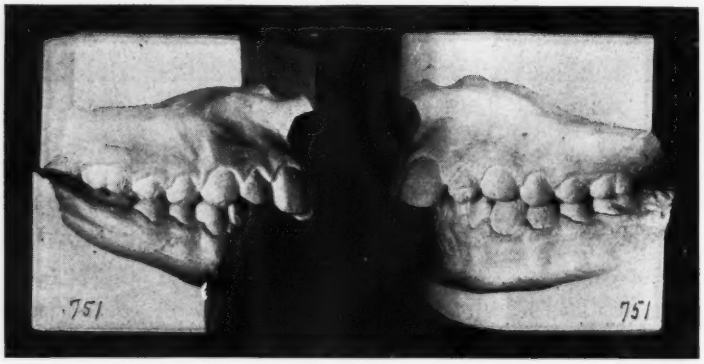


Fig. 31.—Dental models of Fig. 30.

have convinced me of the wisdom of extending the classification of oral deformities and hence the term: *micro-mandibular deformity.* The patient is a boy of nine years, height 54 inches, weight 55 pounds, anemic, who had his

A *B*

Fig. 32.—Shows a mandible too short in body. Female age 11 years. (One-fourth life size.)

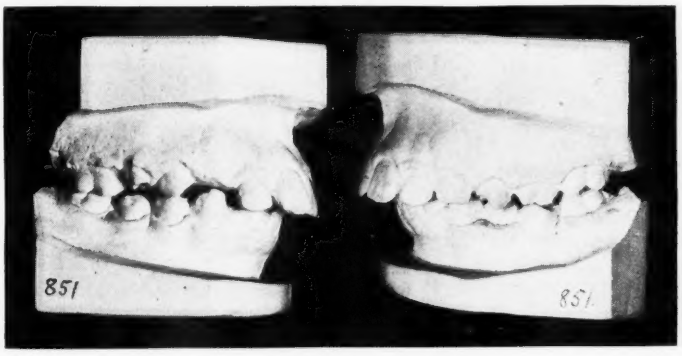


Fig. 33.—Dental models of Fig. 32.

A *B*

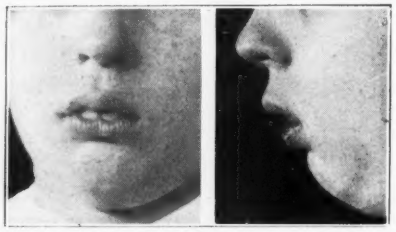
Fig. 34.—Arrest of development of the rami of the mandible. Boy 10 years old. (One-fourth life size.)

Fig. 35.—Dental models of Fig. 34.

adenoids and tonsils removed 3 months previous. His father presents a similar type and the mother has a malocclusion. His denture is shown in Fig. 37.

DIFFERENTIAL DIAGNOSIS

A careful training in observation is very essential to a mastery of the art of diagnosis. The deviations from normality referred to in the definition of distoclusion must be kept in mind whenever a case presents itself. A *micromandibular deformity, mandibular retroversion* (Federspiel), and *mandibular ankylosis* must not be ignored; *their distoclusions are merely symptoms.* To regard them as true distoclusions is to fail in the diagnosis. Allowances must also be made for a possible *mesioversion* of the maxillary molars and



A *B*

Fig. 36.—Arrest of development of the mandible affecting the mentum, body and rami. Boy of 9 years. (One-fourth life size.)

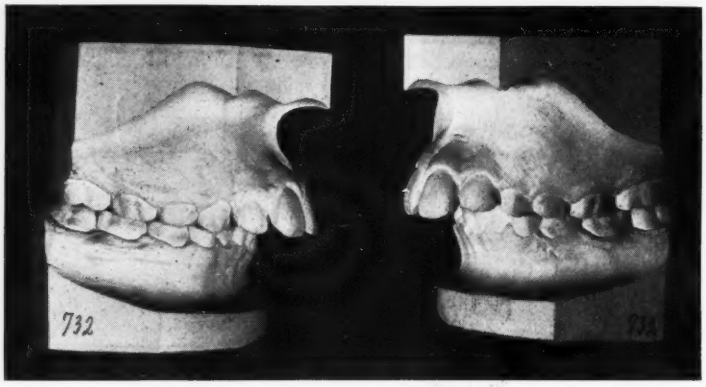


Fig. 37.—Dental models of Fig. 36.

bicuspids. This is frequently found as a complication on one side, and occasionally on both sides. The anterior or mesial movement of these teeth in the mouth of a growing child, even in normal dentures, was pointed out by Zsigmondy in 1911.[18]

It is evident that the symmetry of the arches and their relation to the facial form must therefore be carefully considered. Figs. 38 and 39 show a neutroclusion complicated by mesioversion of *7, 6, 5, 4/4, 5, 6, 7.* Premature loss of the temporary molars may easily permit this.

The pathogenesis of dento-facial deformities is not fully understood, and a great deal of work has to be done before we can appreciate the minute details of every stage of their maldevelopment. The consideration of any given form at various ages is a possible avenue of investigation open to every one.

Occasionally one is fortunate enough to have a record of an individual at various ages. I desire to show a few illustrations that bear upon this phase of the subject.

The relation of the stomion, or oral fissure, to the occlusal plane, in every type of oral deformity, is another subject which awaits investigation. This may occasionally be altered during treatment, but only to a very slight extent when treatment is undertaken early. In unilateral distoclusions the median line deviations, resulting from arch malrelations being limited to one side, are very noticeable. In the younger patients these readily yield to treatment.

The forward and downward voluntary movement of the mandible, to such an extent that the arch relationship and the facial form approaches the normal, may frequently be requested during first consultations as an aid in diagnosis.

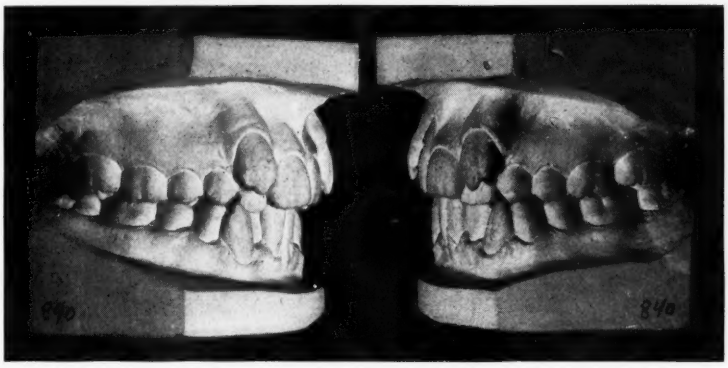
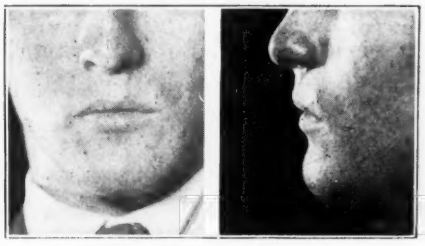


Fig. 38.—Neutroclusion complicated by mesioversion of *7,6,5,4/4,5,6,7*.



A *B*

Fig. 39.—Facial form of case in Fig. 38. (One-fourth life size.)

In conclusion, the writer wishes to emphasize the very great value of standardized, life-size, photographic records. They constitute a most helpful diagnostic aid, and when studied in connection with the plaster models and anthropometric measurements of the facial features, and then reviewed in the presence of the patient, a more adequate and reliable basis for a diagnosis is thus established. An isolated consideration of the occlusal relations of the teeth, as recorded in a plaster model, does not constitute a complete diagnosis. Valuable and necessary as such a study is, it is only one phase of the problem. And cases like the above have convinced the writer that the claim of C. S. Case, namely, that the facial form is frequently a safer guide than the occlusal relations of the teeth, is a step in the right direction.

The acceptance of this view implies a standardization of accurate methods of measurement, applicable to the facial features that are involved in these deformities. The writer does not regard this as an impossibility, but "a consummation devoutly to be wished." Indeed, far more intricate problems than are here involved have frequently been solved by the mind of man. My own investigations during the last five years continually persuade me to this view, but the bounds of this communication far exceed reasonable limits and therefore forbid my dwelling upon it at this time.

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DISCUSSION

Dr. M. T. Watson, Detroit.—Dr. Lischer in speaking of the parents a number of times referred to the fact that their occlusion is normal. I would like to ask him whether he was referring to the mesiodistal relation?

Dr. Lischer.—Yes. There is no similar deformity as in a child.

Dr. Milo Hellman, New York City.—I want to correct certain statements that were made as not harmonizing with my own experience. The paper was read too rapidly for me to grasp everything that was in it.

In the paper I shall read tomorrow I shall deal with a number of the same problems from a different angle. There are several statements made in Dr. Lischer's paper which seem in opposition to some of my findings.

Dr. Lischer stated that individuals living under different economic conditions show certain differences in the eruption of teeth. He mentioned the fact that in the well-to-do they are accelerated, that is, the teeth of the well-to-do erupt earlier, while in the poorer class the teeth erupt later. Am I correct?

Dr. Lischer.—What I said in regard to that was a quotation from anthropologists who examined 50,000 individuals.

Dr. Hellman (resuming).—That is where I find certain differences in my findings. For instance, in a number of individuals examined among the poor and wealthy we found the same things regarding the stature and weight. In the well-to-do individuals, who live under more favorable circumstances, we found the teeth were better cared for; at the same time, they present a higher percentage of occlusion. Furthermore, we found that their teeth did not erupt earlier, but rather later than the teeth of the poorer classes. The poorer classes are less developed, smaller in stature, yet they show acceleration in the eruption of the teeth. This acceleration in the eruption of the teeth is very significant, which means that a loss in the permanent deciduous teeth may be due to lack of dental care. When a tooth is lost

through lack of care the permanent teeth will follow more quickly. On the other hand, the better developed individuals show retrusion with reference to the teeth because they are better taken care of in infancy. Their deciduous teeth are kept longer, and they erupt the permanent teeth later. These observations are made from a large series of individuals (I do not remember exactly the number); however, this is a very accurate estimate because these investigations were conducted on the same racial individuals, but whose economic conditions were different.

Another very interesting point is the statement of these anthropologists saying that the incisors of the female are larger than those in the male. That is right, and it has been verified fairly well, but they do not take occlusion into consideration at all. They do take the size of the incisors into consideration with the size of the other measurements of the head. Whether a tooth is in malocclusion or not, makes very little difference, but the actual size is larger, and it may not be larger than the male incisor, but it is larger in proportion to the other measurements of the head. The head of the female is smaller than that of the male, therefore the proportion is different. So that is correct.

Another thing I wish to speak about is the slide shown by Dr. Lischer by Sigmundy. He showed a certain anatomic point taken with reference to the development of the dental arch. That is very misleading. The anatomic point is taken very accurately, but at the same time it is taken of different individuals of different ages and of different races, and we may have a discrepancy in the type of arch as well as the type of head and type of teeth, so that we have to take all these things into consideration if we want to come to a definite conclusion.

Dr. Edward A. Bogue, New York City.—I am very glad indeed to have had the opportunity of listening to this splendid paper by Dr. Lischer. I wish to thank him from the bottom of my heart for the careful investigations he has made before presenting this subject to us. He has been making investigations among grown up patients, while I have been working in my little corner very largely with little folks around me. I have been only working with babies, you might say, while he has been working with grown ups. Tomorrow I am going to show some pictures of what I have accomplished. In showing these pictures I shall probably be thinking of Dr. Lischer and his work all the time. He has found things as they really are. He has given us truthful representations of what happens, without the intervention of the orthodontist. I shall hope to show you tomorrow what may come when orthodontists have an intelligent comprehension of what we have to do, and do it at the proper time. I thank you.

Dr. B. E. Lischer, (closing).—I want to thank you for your patience in listening to my long paper. The remarks of Dr. Hellman in regard to the greater width of incisors in females I accept, but the point I made about the slide taken from a famous text on anthropology is still well taken, namely, the case exhibited a typical dento-facial deformity with marked labioversion of the maxillary incisors, and the prominence of the lips and mouth was due to that and not to the width of the incisors.

DEPARTMENT OF DENTAL AND ORAL RADIOGRAPHY

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ORAL ROENTGENOLOGY

BY COLLINS A. LE MASTER, D.D.S., ST. LOUIS

Professor of Roentgenology at the St. Louis University, Dental Department

ROENTGENOLOGY is a most important means of diagnosis and offers a great aid in the treatment of most diseases of the mouth. This is well known to the modern dental surgeon and no one who has the welfare of his patient at heart, as well as his own for that matter, can practice dentistry without its aid. In regard to the welfare of the patient, let us stop and consider his side of the matter; when he places himself in our hands for dental advice and services, he puts himself, as it were, at our mercy. We are trusted implicitly and it is up to us to give him expert guidance and service. Now we know that the history given us of his case is sometimes misguiding, but it is nevertheless an intricate part of our examination. Are we so expert as to feel that with our instrumental examination, digital examination, and history of the case, we are able to determine everything abnormal in the patient's mouth? We must seek other assistance; and the roentgen ray, while not absolutely perfect, is of known value; it certainly adds a great deal to the final diagnosis of the case and acts as a final check on our other findings. All of these, together with the bacteriological test, give our patients as thorough and conscientious a service as is possible with our present knowledge.

Let us now consider the dental surgeon's side. Recall the many men in our profession who have given us valuable ideas both from a diagnostic and mechanical standpoint since the use of the roentgen ray. It has stimulated research work in our profession by showing us things we have never known before; it has opened new and untrodden fields to us; and it acts as a guide to good dental service and advice. True, it shows up the defects in our work, which we as humans dislike to see, but one never reaches his ideal without being shown his faults. This stimulates us to do better work and shows us the results we are getting, which is the thing we all hope to do, obtain results.

The subject chosen for this article is very broad, but I will endeavor to cover as much of the field as will be possible, laying special emphasis on the interpretation of the roentgenogram, with a few practical ideas as to the technic.

To properly interpret the roentgenogram, a thorough knowledge of the roentgen ray, as well as the anatomy of the part to be examined, together with the various problems of dentistry, must be known. Let us remember that the roentgenogram does not record diseases, but only the variation in the density of the various structures and tissues.

It is well to consider the appearance of normal conditions with special

Fig. 1.—Maxillary centrals and laterals on one roentgenogram. Are the areas of involvement surrounding the apices of the roots advanced or are they superimposed shadows?

Fig. 2.—Right maxillary central and lateral incisors, roentgenogram shows no superimposed shadows, the areas of destruction can be clearly outlined.

Fig. 3.—Shows antrum shadows superior to root of the bicuspid and molar also to the first bicuspid area.

Fig. 4.—Shadows of the antrum over the end of the roots of the molars. Note the granulomatous area on the apex of the mesio-buccal root.

emphasis on normal conditions which are mistaken for abnormal ones. The two jaws, maxilla and mandible, are very dissimilar in their makeup and appearance on the roentgenogram. The upper jaw, maxilla, is very porous in its structure and has definite landmarks; such as the maxillary sinus (antrum), zygomatic arch, the maxillary tuberosity, and posterior to this with the direct angle radiogram, is seen the pterygoid lamina. This is normally seen when the angle of the central ray is at a right angle to the teeth. The mandible, lower jaw, is a very compact bone in its structure and shows as very regular in makeup and of fairly uniform density on the roentgenogram. The mental

foramen opposite the lower bicuspids and the inferior dental canal are also some of the landmarks.

A few words as to normal conditions which are often misinterpreted as abnormal: In the maxilla, in the central and lateral incisor regions, radiolucent, black areas are sometimes seen over the apices of the roots suggestive of an involvement of the process, which may be the shadows of the nasal openings or the anterior palatine foramen. These must not be mistaken for pathologic conditions and must be kept in mind. The method of avoiding these shadows is to make two roentgenograms, one to include the right central and lateral incisor and one for the left central and lateral incisors, tipping the tube acutely towards the median line in both instances, and these shadows will be thrown off the film entirely, the centrals and laterals showing without any superimposition of shadows. (Figs. 1 and 2.)

Fig. 5.—Maxillary molars with the zygomatic arch superimposed over roots.

Fig. 6.—Maxillary molars showing the roots of the molars clear in outline; note granuloma area on lingual root with absorption of the apex.

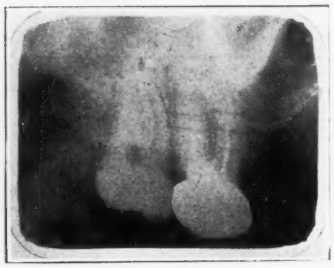


Fig. 7.—Maxillary molar with zygomatic arch superimposed over roots.

Fig. 8.—Same case as in Fig. 7, with modified technic showing granulomas on roots. Patient had very heavy zygomatic arch.

The bicuspid and molars on either side, the antrum shadows which appear black on the roentgenogram may be mistaken for an area of destruction of the process; this appears at all times over the molar roots but only at times over the bicuspid roots, due to the angle from which the roentgenogram was taken (Figs. 3 and 4). The zygomatic arch (process) which usually appears as a dense white shadow over the apices of the upper molar roots, usually obliterates the roots and the periapical regions and makes proper interpretation of the roentgenogram practically impossible. To avoid this shadow and also to help overcome the superimposition of the antrum shadow I will refer the reader to my article "A Modification of Technic for Radiographing Upper Molars," in the *Journal of the National Dental Association,* April, 1921, viii,

No. 4, pp. 328 and 329; the *Journal of Radiology,* Department on Technic, June, 1921, ii, No. 5; also the *American Journal of Roentgenology,* November, 1921. (Figs. 5, 6, 7 and 8.)

The coronoid process of the mandible occasionally appears in the neighborhood of the maxillary third molar region due to superimposition, which might be mistaken for the roots of the maxillary third molar or an unerupted third molar. It is a white dense shadow and can usually be determined by its shape. (Fig. 9.)

The Mandible.—In the bicuspid region we have the mental foramen which may be superimposed over the apices of the roots of either bicuspid. It appears on the roentgenogram as a black area suggestive of a granuloma. This must be borne in mind and when such a condition presents itself a check-up roentgenogram should be made at an exaggerated angle, mesially or distally, to see whether the area again appears in the same position as on the previous one. If it appears in the same position, it may be interpreted as

Fig. 9.—Maxillary molar showing the coronoid process posterior to third molar also the pterygoid lamina.

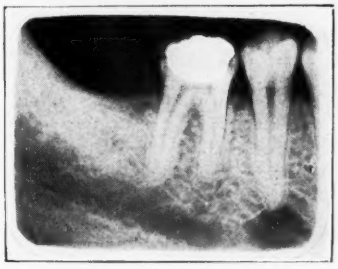


Fig. 10.—Shows the mental foramen opposite apex of mandibular second bicuspid.

Fig. 11.—Showing the mental canal inferior to the apices of the first and second bicuspids.

Fig. 12.—Showing the mental canal inferior to the apices of the mandibular bicuspid and molars.

an area of destruction; if it has moved from the end of the root, mental foramen. The vitality test should always be made as a check on these conditions. (Fig. 10.)

The inferior dental canal running beneath the apices of the bicuspid and molars is very often misinterpreted for areas of destruction of the process, fistulous tracts, and granulomatous areas. These conditions are difficult to rule out and various methods are employed. If searching for a fistulous tract in the neighborhood of an infected tooth, attempt the injection of Beck's paste and make another roentgenogram. The paste will appear as a very white shadow easily discerned, and if there is a fistulous tract, it will follow the tract. Stereoroentgenograms are also very valuable in determining these conditions. (Figs. 11 and 12.)

In taking an extraoral roentgenogram, with the plate on the outside of the cheek for the mandibular third molar area, we may have black shadows in the region of the mandibular third molar and posterior to the third molar region in the angle of the mandible itself suggestive of an extensive involvement of the bone. This may be superimposed shadows of the neck, esophagus, etc. Operations have frequently been performed on mandibles that have been found to be normal after the diagnosis of advanced bone involvement. This is a serious mistake but nevertheless often made. (Fig. 13.)

Let it also be remembered that a child's permanent tooth when erupting

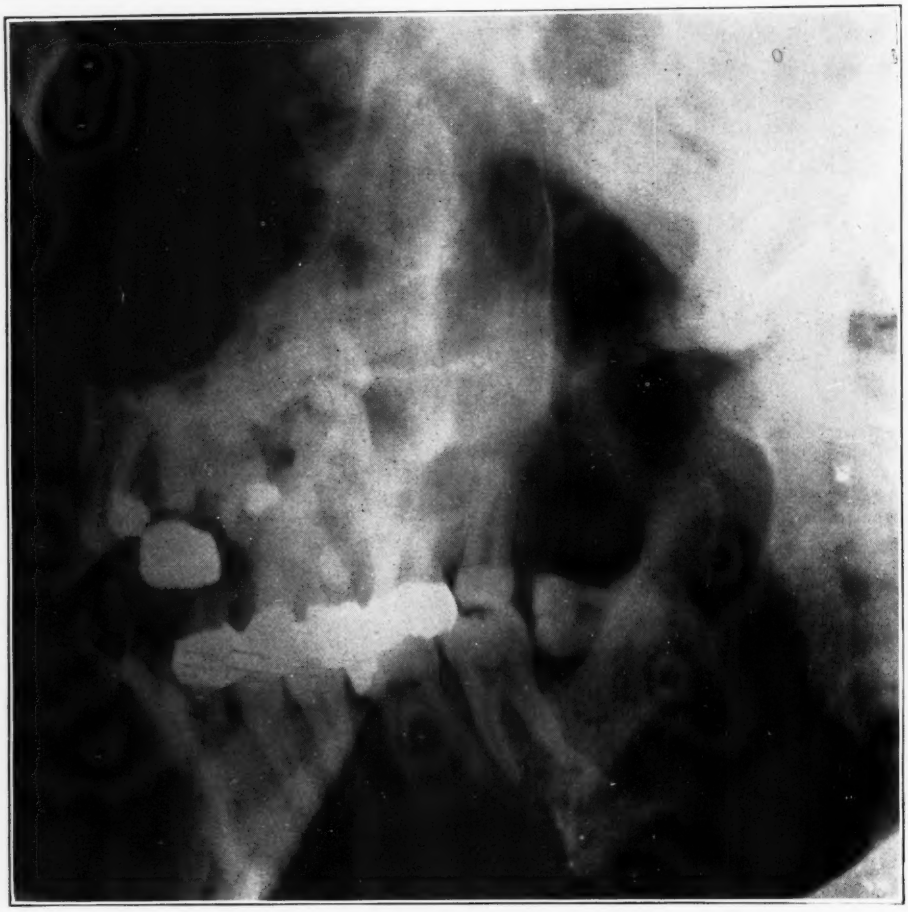


Fig. 13.—Showing the area of the mandible posterior to the third molar. Radiolucent area is the superimposed shadows of the neck.

leaves an open space in the process by its path of eruption and often when the teeth are fully erupted we find a radiolucent area surrounding the apex of the root; this is frequently found also when third molars have just erupted. These conditions may be misinterpreted for granulomatous areas; they can be explained by the fact that the path formed by the erupting tooth has not fully regenerated, and then, too, the roots may not be fully formed. If checked up with another roentgenogram at a later date it will be noted that the root apex is completely formed and that the process surrounding the apex has developed into a normal appearing tissue (Fig. 14).

The above are some of the conditions which are often misinterpreted and it is absolutely necessary that one bear these in mind when interpreting a roentgenogram.

In discussing the pathologic conditions of the teeth with reference to the interpretation of the roentgenogram I will partly follow Thoma's Oral Roentgenology, for in his book we find a very complete outline and one which practically covers the entire field.

1. THE IRREGULAR ERUPTION OF THE TEETH

A. Misplaced Teeth may be found in any part of the maxilla and mandible and it is always important to include in the roentgenogram all places where they could be located. For this reason it is usually advisable to take an extraoral roentgenogram so as to include such places as the nasal cavity, the maxillary sinus, and the lower border and ramus of the mandible. These

Fig. 14.—Showing child's teeth erupting, leaving radiolucent areas at the apices of the roots. Apices of roots not formed.

Fig. 15.—The occlusal bite method of localization. Shows cuspid and bicuspid to be lingual to anterior teeth. That is all. Dry specimen.

teeth often should be localized for extraction and one of the most successful means is the use of the stereoscopic method (Figs. 15, 16, 17).

B. Unerupted Teeth: Impacted Teeth.—Roentgenograms are of value in cases of unerupted and impacted teeth to determine the position of the tooth; whether it is simply an unerupted tooth or whether impacted. We find that the mandibular third molar is the tooth which most often gives us this difficulty and is the tooth most frequently found impacted. Next are the maxillary cuspids, but any tooth whether maxillary or mandibular may be found in this condition. It is always necessary to localize these teeth before either extraction or when orthodontic treatment is contemplated. It is usually very deceiving from a flat roentgenogram to tell where the tooth lies with reference to the surrounding teeth and structures. The most valuable and convincing method is the stereoroentgenogram, as it gives the operator perspective and

he can really see the position of the tooth. This method is a boon to the roentgenologist, for with it he gains results which he has failed heretofore to obtain (Figs. 16, and 17).*

C. Partially Erupted, Impacted Teeth.—The condition frequently occurs where a tooth only partially erupts and fails to advance any further. The roentgenogram often shows us what conditions are holding back this tooth, and after the obstruction is removed, the tooth continues in its path of eruption until it reaches its proper place in occlusion.

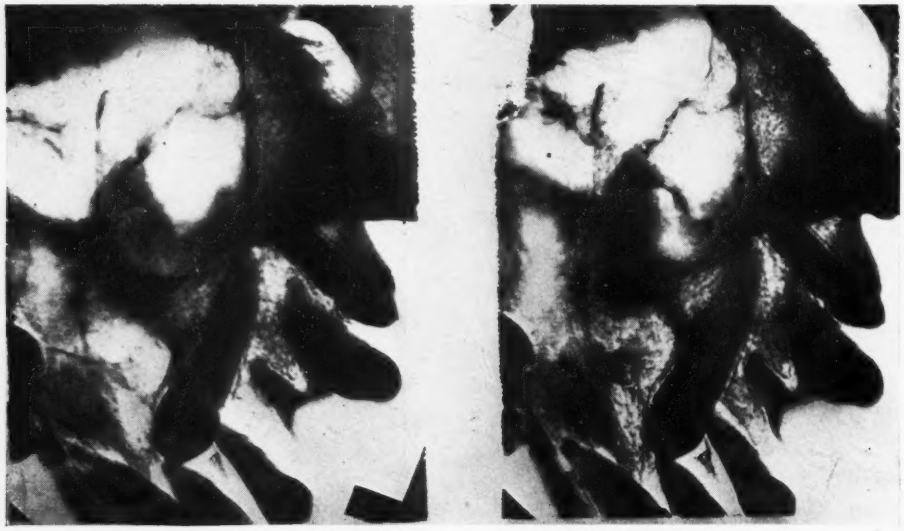


Fig. 16.—Dry specimen. Same as in Fig. 15. Localizes the cuspid with the stereoscopic method. Shows position of cuspid with relation to the surrounding teeth. This cut may be viewed through a hand stereoscope by mounting it on card board.

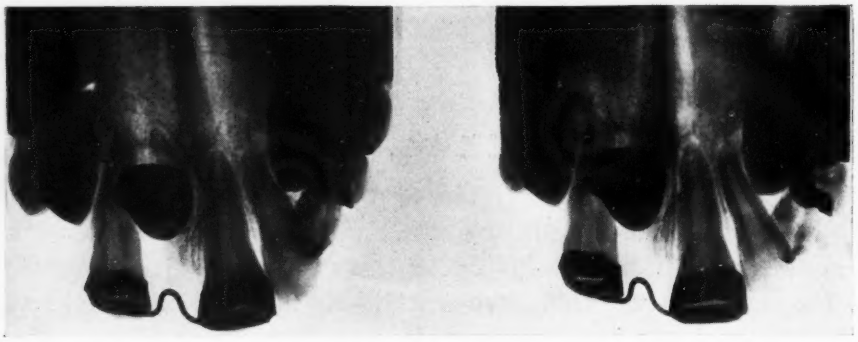


Fig. 17.—Showing the position of an unerupted central incisor with the stereoscopic method. Also note cuspid. Actual case.

D. Supernumerary Teeth.—Frequently supernumerary teeth are found and may be the cause of obscure neuralgia pains, and without the use of the roentgenogram the condition is very often overlooked. These teeth may be found in any part of the maxilla and mandible, and all of these areas must be included whenever the symptoms and history of the case might lead us to

*Le Master, C. A.: "Dental Stereoroentgenography," *International Journal of Orthodontia and Oral Surgery*, June, 1921, vii, No. 6.

believe that such a condition exists. Again these teeth must be localized before extraction. (Figs. 15, 16, 17.)

2. DISEASES OF THE HARD TOOTH SUBSTANCE

A. Abrasion.—Abrasion is a physiologic process, the teeth having been worn down by mastication. The value of the roentgenogram here is to determine the proximity of the abraded surface to the pulp of the tooth. This is frequently valuable as a guide to diagnosis and the determining of the proper treatment procedure.

B. Fractures.—A condition often overlooked is the fractures of the teeth which occasionally occur beneath the gum margin and are not noticeable in the digital and instrumental examinations. Roentgenograms should always be made of fracture cases whether the history given be that of an old or of a recent occurrence. It is not always possible to show the fracture of a tooth on a roentgenogram. Fractures generally occur in a horizontal direction, and teeth that have posts in the canals usually fracture vertically. If the vertical fracture lies in a labiolingual plane, it can be easily demonstrated, while the distolingual cannot always be shown. I have found that by attaching a ligature to the crown of the tooth and instructing the patient to exert pulling force on the tooth while making the exposure for the roentgenogram, it is often possible to show the fracture, as thus the fragments are displaced. This is particularly true where the fracture occurs in the horizontal direction without displacement of the fragments.

C. Caries is the most common form of dental disease, and while it is, as a rule, easy to find with the instrumental examination, it often occurs in an inaccessible place, such as the proximal areas of the teeth, beneath fillings and crowns, the gingival margins, and beneath the gingiva. It appears as a black, radiolucent area on the roentgenogram. Caries must never be overlooked as it is the starting place for the loss of the tooth, and is often the cause of pains which we diagnose as imaginary on the part of the patient.

D. Odontoma.—A tumor of the teeth. An odontoma is made up of various tooth substances (tissues) one or more of which may enter into its composition. It may be attached to one tooth or may be made up of two or more teeth fused together. They are usually easily recognized and appear as large dense white areas of various shapes. The value of the roentgenogram for these cases is to determine their presence, size and proximity to surrounding structures.

E. Exostosed (Hypercementosed) Roots.—The roentgenogram is valuable for exostosed roots, especially when extraction is contemplated. We have all experienced the difficulty in extracting such teeth and have regretted the damage we have done to the surrounding teeth and tissues. Many devitalized teeth have this condition present on their roots and it will save us much difficulty if before extraction we know that such a condition exists.

F. Necrosis of the Root.—In the roentgenogram necrosis of the root is recognized by the poorly defined outline of the apex and in the later stages by actual loss of the apex of the root. The roentgenogram is valuable from a

diagnostic point of view from the fact that these conditions may be found in their early stages and if advanced they surely would not offer a firm anchorage for a bridge or canal post.

G. Pulp Stones.—We might classify pulp stones as a disease of the hard tooth substance. The roentgenogram is of value in diagnosing cases of neuralgia and in cases in which the death of the pulp of the tooth has taken place without any appreciable cause. They appear on the roentgenogram as an opaque (white) shadow within the pulp chamber. It must be remembered that a shallow alloy filling or a synthetic filling with a heavy cement base might appear similar to a pulp stone if they are either on the buccal, labial or lingual surface of the teeth, due to superimposition, and should always be checked up with a careful instrumental examination.

3. DISEASES OF THE PULP AND THEIR SEQUELA

A. It is absolutely necessary for the dental surgeon when contemplating the removal of the pulp from teeth to know the size, shape, and number of root canals. We have had the experience, every one of us, of laboring over the filling of root canals until we were ready, as the pugilist says, "to throw up the sponge." The filling of root canals is at best a difficult procedure, and if the roentgenogram will simplify the operation any, surely we should make use of it. The procedure which I advocate when root canal work is to be done is as follows:

1. Have a roentgenogram made before the operation is commenced so as to get a bird's-eye view of the field of operation; namely, is there any obscure caries which might cause leakage of the devitalizing agent from the cavity into which it is sealed to another which communicates from the mouth. Is there some condition which might indicate extraction of the tooth, such as very irregular roots which are impossible to fill, and the tooth would be better out than retained with poor root canal work? Often we find large areas of destruction at the apices of these teeth; *nerve tissue is very highly resistant to destruction by bacteria and often it functions while the process in that area is destroyed and badly diseased,* necessitating the extraction of the tooth to drain the infected area. Also in molar teeth, if the process of the interradial area is involved either by a pyorrhea condition, trauma or perforation of the subpulpal wall, the tooth is seldom worth treating.

2. After nerve canals are reamed and cleaned out, place diagnostic wires in the canals to determine whether you are in the canals; how far you come to the apex of the root and whether you have punctured any part of the canals.

3. After the root canals are filled, make another roentgenogram to determine whether the work has to be done over. This last step is the essential one, for surely if we hope to do good root canal work, we must live up to this rule.

B. So-called Dead Teeth.—Can the fact that a tooth is dead be determined by the roentgenogram? The dead pulp cannot be differentiated on the roentgenogram from a live one unless it shows a condition present which might have caused its death, such as caries, pyorrhea pocket which might extend to the apex or the proximity of an unerupted tooth.

4. THE SEQUELA TO DISEASES OF THE PULP

The *Alveolar Abscess* is perhaps the most important condition we have to consider because it has opened up a field to the dentist, which before the use of the roentgenogram was not definitely known. It has made the dentist a most necessary factor in physical examinations. We have read and heard so much about focal infection and have had the experience of carrying through cases of this character in our practice that we can realize the importance of our examinations to humanity. A great burden has been put upon the dentist's shoulders and we are proud to state that he has carried it well.

A. The Granuloma.—The granuloma is usually found in the following locations. The *apical granuloma* is most commonly found in the periapical regions. It appears on the roentgenogram as a black area surrounding the apices of the roots of the teeth. Do not forget that there are many normal conditions, mentioned before, which might deceive one.

B. The Interradial Granuloma is seen directly beneath the pulp chamber. The floor of the pulp chamber may be penetrated either with a burr, reamer, or caries or inflammation may set in through a pyorrhea condition or injury, with a resulting granuloma formation.

C. The Lateral Granuloma.—Granulomas on the lateral surface of roots of teeth are usually caused by perforation of the root wall, the extremely close proximity of a post to the periphery of the root wall, and external injury. Bear in mind that such a condition is not always easily obtained on a roentgenogram especially if it is situated on the buccal lingual or labial surface of the root, as the root being a dense material will often obliterate the granuloma area.

5. DISEASES OF THE MARGINAL PART OF THE PERIDENTAL MEMBRANE

A. Marginal Periodontitis or Pus Pockets are frequently found on single teeth and are due to infection of the marginal part of the peridental membrane with involvement and destruction of the bone which forms the alveolar socket. They are caused by injury or irritation from ill-fitting crowns, overhanging filling margins, faulty proximal contact of teeth and fillings, foreign substance such as ligatures, portions of rubber dam left between the teeth, the cleaning of the interproximal areas, especially with the tooth pick, etc. These pus pockets appear on the roentgenogram as black areas.

Pyorrhea Alveolaris.—The roentgenogram is of special value in all pyorrhea cases inasmuch as it helps to differentiate the hopeless cases from those of the milder form. In fact it is the best means we have of determining the extent of destruction. The instrumental examinations are not complete, and cases we would diagnose as early and not far advanced sometimes show on the roentgenogram as well advanced. The roentgenogram is of value in differentiating such conditions as pyorrhea, lateral granulomas, and pericementitis. In cases of pericementitis, the peridental membrane which appears on the roentgenogram as a black line surrounding the root of the tooth is more thickened than normal. Results of pyorrhea treatment may be checked up by means of the roentgenogram and it is always advisable to have the patient

rayed at stated intervals, every six months to a year. These check-up roentgenograms are especially of value in cases in which granulomatous areas have been treated, to determine whether regeneration has set in or not. It usually takes from six months to a year for these granulomatous areas to show regeneration. Nothing can be told of the conditions sooner as the regeneration of the process will not show on the roentgenogram. Therefore, do not expect, as a rule, that the roentgenogram will show any difference in the condition earlier than six months.

6. DISEASES OF THE JAW

The value of the roentgenogram in determining the presence, extent, and kind of disease of the jaw is of unlimited value, and whenever disease is suspected, a roentgenogram must be made. The diseases of the jaw may be classified as follows:

A. Atrophy of the Jaws.—The value of the roentgenogram in atrophy of the jaws is to determine, if possible, the cause and extent of the condition.

B. Fractures of the Jaws.—Whenever the history given is that of a possible fracture of the jaw a roentgenogram must be made to determine the presence of the fracture, its position, extent of injury, displacement of fragments, and probably its cause, pathologic fracture. The stereoroentgenogram is always of value in these cases, as it localizes the position of the fragments.

C. Ostitis and Necrosis.—The roentgenogram often shows the extent of the bone involvement and possibly the cause for same.

D. The Dentigerous Cyst.—The roentgenogram localizes the cyst, showing structures involved, and usually the starting point of the cyst, and cause.

E. Tumors are localized on the roentgenogram and are differentiated by their difference in structural appearance and location.

7. LOCALIZATION OF FOREIGN BODIES

The roentgenogram is of special value in the localization of foreign bodies, such as broken-off needles, burrs, reamers, etc. The different methods of localization may be used, but where the foreign substance is to be localized near surrounding teeth, the stereoroentgenogram is the most practical, as the superimposition of the various teeth and structures make the angle method practically valueless while the stereoroentgenograms are not absolutely accurate, they are as a rule, enough for the average dental operation. (Fig. 18.)

8. SINUSES

The dentist may be called upon to diagnose dental conditions which are suspicious of causing an antrum (maxillary sinus) involvement, sinusitis, and he should be familiar with the difference between the antrum that appears normal and the one that appears abnormal on the roentgenogram. An antrum full of fluid, pus or growth will appear light on the roentgenogram as compared with the normal one. The normal sinus being an air space is empty and offers no resistance to the passage of the Roentgen ray thus blackening the plate or film. Therefore if the findings of the teeth are such as to be suspicious of causing antrum involvement and the history of the case points to it, the

dentist, to determine his operative procedure, should know the condition of the antrum so that he can refer the case to the nose and throat specialist and work in conjunction with him. I believe that the dentist should not treat antrum conditions unless he is working under the instructions of a nose and throat specialist. It is very often necessary to drain these conditions through the mouth and it should be the duty of the dentist to establish this opening only upon order of the specialist, then let him handle the case after the opening has been made.

The foregoing paragraphs show briefly those conditions in which the roentgenogram adds value to the dentist's diagnosis.

A few words as to the position which the dental roentgenologist, radiodontist, holds and what the general practitioner should expect of him. We all know that the roentgenogram is of value in establishing a diagnosis of

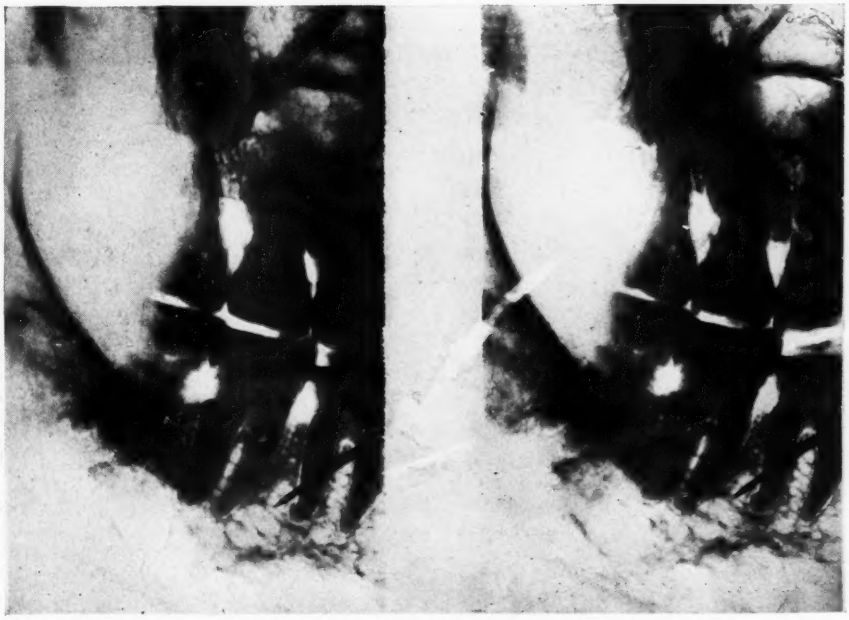


Fig. 18.—Dry specimen. Mandibular teeth buccal aspect stereoroentgenogram. Broken off hypodermic needle opposite distal root of the first molar on the buccal surface.

cases, but it is only one little part of the dentist's diagnosis. The roentgenologist only handles referred cases, and the patients are always better able to give an accurate history of their case to the man who referred them and who expects to do their dental work. This, together with his instrumental examination and his ability to better determine the needs of the patient, knowing him better with the roentgenogram and the roentgenologist's interpretation of it, enables him to arrive at a diagnosis. I therefore contend that the roentgenologist's field is not that of a diagnostician, but that his work is exclusively the making and interpreting of the roentgenogram. Every one who is specializing becomes narrow in other branches of his profession and I feel that all that should be expected of the dental roentgenologist is a good clear roentgenogram with his interpretation of it, with possibly suggestions from an x-ray viewpoint.

FALSE ANKYLOSIS DUE TO DECIDUOUS TOOTH IN SINUS

By H. F. Chaiken, D.D.S., Reading, Pa.

A YOUNG lady school teacher, age twenty-four, came to my office about two months ago with the mouth closed, complaining of pain in temporal region.

I examined the mouth and I found an impacted third molar. With a statement full of confidence, I told the patient that there lay the trouble. I gave her conductive anesthesia and removed the tooth. She seemed to improve a little, as far as opening the mouth was concerned, but I told her that it would

Fig. 1.

take a little while for complete recovery. Two weeks later she came back with the mouth completely shut, even worse than before. I was unable to place a cement spatula between the teeth.

On a large x-ray plate, one will notice (Fig. 1) it appeared as though there were a foreign body in the sinus, resembling a tooth. Under a general

anesthetic, I opened the maxillary sinus and, after spending a considerable time in exploration, I removed the crown of a deciduous molar.

I also found a great amount of necrotic bone. After curetting and washing with a normal salt solution, I closed the sinus. Two days later the patient was able to open her mouth and the pain disappeared.

What I cannot understand is how the deciduous tooth got into the sinus. The patient gives a history of having had the second premolar extracted about two years ago.

A STUDY IN THE MANAGEMENT OF TOOTH MOVEMENT WITHOUT APPLIANCES

By R. C. Willett, D.M.D., Peoria, Ill.

ELIZABETH F., aged ten years, nine months. The maxillary central and lateral incisors were reported to have erupted in normal alignment, but had recently assumed the fan-shaped position shown in Fig. 1. There was a mottled condition of the enamel of the permanent teeth, and what appeared to be a prolonged retention of the remaining deciduous teeth. The mouth and teeth had the appearance of excellent care. The radiograms were made to determine the cause of the undesirable migration of the lateral incisors.

From the radiograms as exhibited in Fig. 1 we assumed that the malposition of the lateral incisors as presented was due to the course of eruption of the permanent canine teeth. The deciduous canines were extracted, and, while they appeared in the radiograms to have little or no attachment, we found them firmly fixed.

On April 29, 1921, four months and eleven days from the date of the first visit, the case was re-examined and radiograms were made as shown in Fig. 2. At this time there was a noticeable improvement in the position of the lateral incisors.

On July 30, 1921, the case was again examined, and it was considered best to apply the theory and practice of Dr. Charles R. Baker (The Exchange of Deciduous Teeth for Permanent Teeth), so the remaining deciduous teeth in both arches were extracted.

The radiograms in Fig. 3 show the normal eruption of the right cuspid and an improvement in the course of eruption of the left canine. Allowing for the approximal space existing between the premolar teeth of the left side, we have reason to believe that with the distal migration of the first premolar, the canine will have ample space in which to assume equally as good a position as the corresponding member on the right side. If mechanical force had been

applied through the use of appliances in the treatment of this case in an effort to re-establish the normal position of the lateral incisors, it would have resulted in nothing more or less than a malposition in the later eruption of the permanent canine teeth. This also illustrates the necessity of carefully checking up

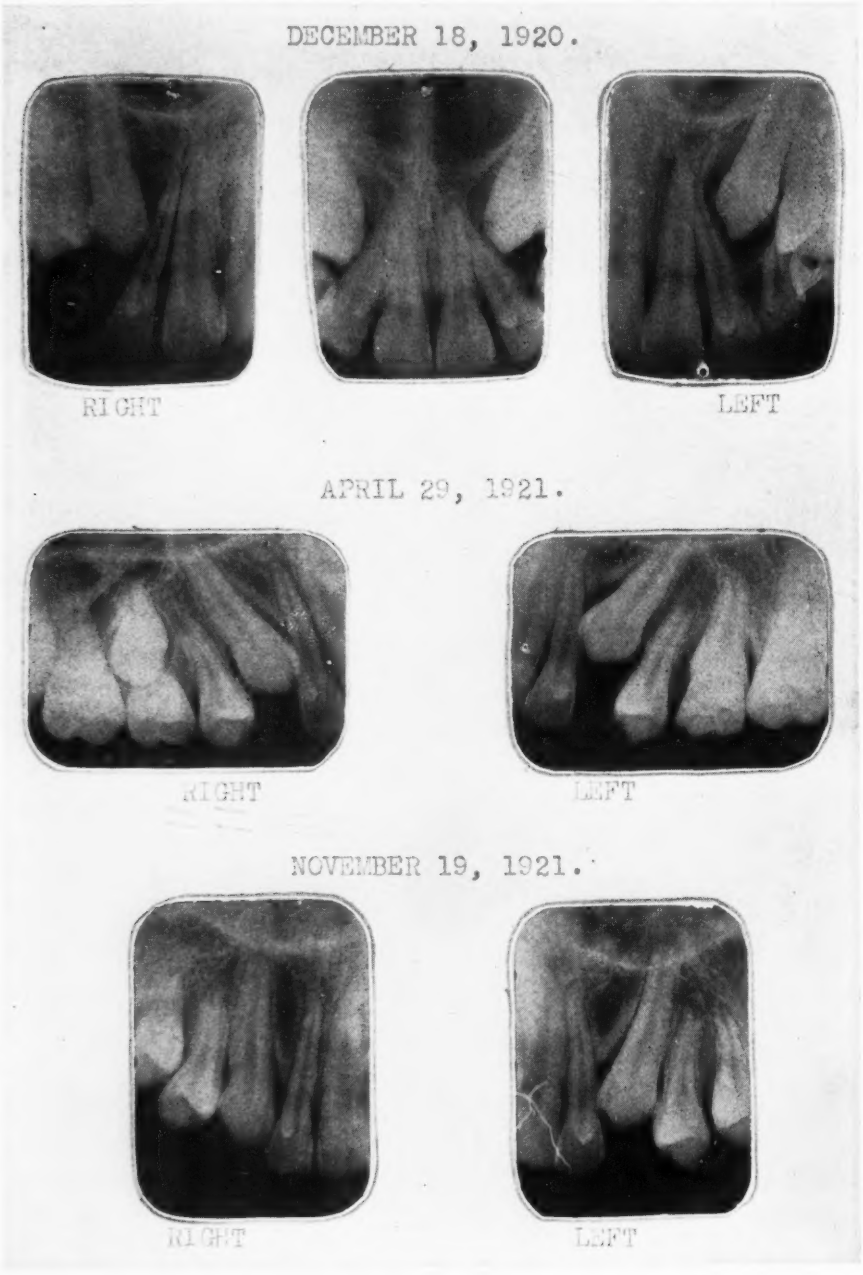


Fig. 1.

Fig. 2.

Fig. 3.

the movements of the unerupted permanent teeth by a frequent use of the radiogram to determine whether or not dentition is following the normal course of development.

PATENTS

ORTHODONTIC IMPLEMENT, PATENTED JULY 13, 1920*

MY invention relates particularly to that class of devices that are adapted to facilitate the placing or adjustment of tooth-positioning devices, and is particularly directed to implements employed in the manipulation of anchor-bands.

The principal objects of my invention are to provide an implement by which the anchor-band or other tooth-engaging means may be rotatably adjusted upon the tooth, and may be forced to conform thereto, and be held in proper position while being clamped to the tooth.

Other objects of my invention are to provide an implement arranged to adjust anchor-bands to natural teeth, and having members so correlated as to afford free access to the clamping mechanism of the anchor-band, and so formed as to afford freedom of movement without interference with the other teeth in the patient's mouth.

Specifically stated, the form of my invention as hereinafter described, comprehends an implement of the class described, in the form of a pair of pliers having one beak thereof arranged to engage the exterior wall of an anchor-band, and the other beak extended laterally and terminating in a claw, which is arranged to engage the free end portion of the threaded shank of said anchor-band within the dental arch, for the purpose of rotating or twisting said anchor-band into proper position upon the anchor tooth, said beaks being movable toward and from each other for the purpose of pinching the anchor-band around the anchor tooth to conform it thereto.

My invention also includes all of the various novel features of construction and arrangement as hereinafter more definitely specified.

In the accompanying drawings, Figure 1 is a perspective view of a dental implement constructed in accordance with my invention; Fig. 2 is a plan view of the lower dental arch, having an orthodontic appliance attached thereto and showing the dental implement, illustrated in Fig. 1, applied to the terminal anchor-band and holding it in proper position to be clamped. Fig. 3 is a side elevational view of the implement shown in Figs. 1 and 2; and Fig. 4 is a front elevational view of said implement.

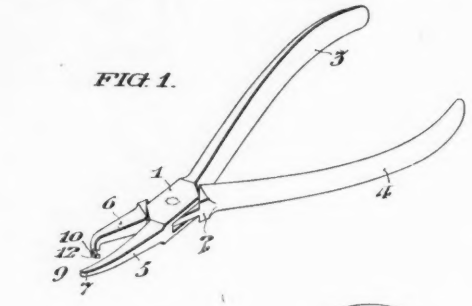
In said figures, the anchor-band placing or adjusting implement comprises a pair of pliers having the pivoted members *1* and *2* provided with handles *3* and *4* and beaks *5* and *6*, respectively. The beak *5* has its free end *7* slightly curved inwardly toward the beak *6*, and its inner surface slightly concaved by providing it with the longitudinal groove *9*, as best shown in Figs. 1 and 4. The beak *6* has its free end bent laterally in outwardly inclined relation to the

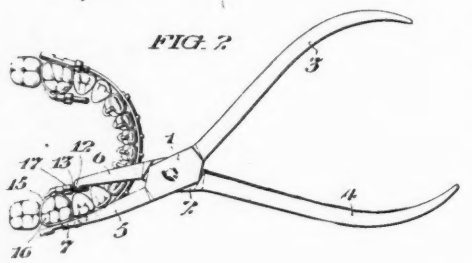
*Patent No. 1,346,584, United States Patent Office.

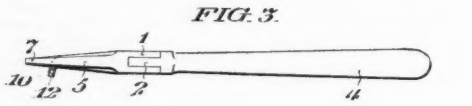
plane of oscillation of the pivoted members *1* and *2*, and its inner surface adjacent to said free end provided with the slot *10* extending transversely thereof to form the claw *12*.

As best shown in Fig. 2, the claw *12* is arranged to grasp the free end portion of the threaded shank *13* of the anchor-band *15*, and hold it as close as possible to the inner line of the teeth of the dental arch while it is being clamped to the anchor tooth *16* by rotating the nut *17* on said threaded shank *13* in a manner well known to the profession.

It will be readily seen that by engaging the beak *5* with the exterior wall of the anchor-band *15* and engaging the threaded shank *13* by the claw *12* of the beak *6*, which may extend across the dental arch as shown in Fig. 2, the anchor-







No. 1,346,584

band may be pinched tightly around the anchor tooth *16* by squeezing the handles *3* and *4* toward each other, and at the same time said anchor-band may be rotatably twisted upon the anchor tooth *16* for adjusting it in its proper relation thereon.

It may be here noted that an implement constructed in accordance with my invention may be advantageously employed to direct the free end of the threaded shank of the anchor-band towards the teeth while being clamped to the anchor tooth, so as not to interfere with the tongue of the patient.

I do not desire to limit my invention to the precise details of construction and arrangement as herein set forth, as it is obvious that various modifications

may be made therein without departing from the essential features of my invention as defined in the appended claims.

Having thus described my invention, I claim:

1. An implement of the class described, comprising pivoted members movable toward and from each other, and arranged to embrace a tooth-band, one member being arranged to engage the bend and the other being arranged to engage the threaded shank thereof.

2. An implement of the class described, comprising a pair of pliers having opposed beaks, one of which is bent laterally to form a claw.

3. An implement of the class described comprising a pair of pliers having opposed beaks, one of which is curved inwardly and the other bent laterally to form a claw.

4. An implement of the class described comprising a pair of pliers having opposed beaks, one having a concaved inner surface and the other having a transverse groove to provide a claw.

5. An implement of the class described, comprising a pair of pliers having opposed beaks, one of which is curved inwardly and provided with a concaved inner surface, and the other being extended laterally oblique to the plane of oscillation of said beaks, and provided with a groove adjacent to its free end forming a claw.

ABSTRACT OF CURRENT LITERATURE

Covering Such Subjects as

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

The Present Status of Education in Orthodontia. F. B. Noyes (Chicago). The Dental Cosmos. October, 1921, lxiii, 10.

The author mentions orthodontia as part of the undergraduate curriculum and as a specialty of dental practice. Thus far instruction in this subject of teaching orthodontia has no status at all. Any one with a legal right to practice dentistry can practice it. There are no special colleges to teach orthodontia and confer degrees, any more than there are special colleges for teaching ophthalmology or any other medical specialty. The ordinary medical practitioner has a perfect legal status as an operating surgeon if he chooses to assume it.

Our orthodontists are of one of four sources: ordinary graduates in dentistry, with or without experience in dental practice; men who have taken short commercial courses in orthodontia; those who have worked up some knowledge of the subject in dental infirmaries, and finally those who have studied under an expert in the old relationship of preceptor and pupil.

In regard to the undergraduate dental college it has not been of much service in teaching orthodontia as part of the curriculum. The evolution of this branch has been outside the college walls. The curriculum is already overcrowded, and instead of giving more and more time to the higher developments of dentistry it will be necessary to take the opposite course in giving more and more time to the fundamentals, including the principles which underlie orthodontia.

Thus the student of the future will study occlusion as the basis of orthodontia, including the Angle conception. Before practicing he must learn things which cannot be taught to the undergraduate in his regular curriculum.

The special course in orthodontia should not be elective for those who are to specialize in it, but all undergraduates should take it before receiving their diplomas. But the dental school, despite this instruction in principles and technics, cannot turn out finished orthodontists, any more than the medical school turns out skilled ophthalmologists. The author advocates thirty-two lectures on the principles and sixteen hours additional in technical instruction of orthodontia.

In regard to postgraduate teaching, the author looks forward as in a dream to a special orthodontic college. The so-called courses for graduates teach nothing beyond what is in the undergraduate curriculum. There should be at least a solid year of special instruction, corresponding to an internate of a medical graduate in a hospital. The last four months should be exclusively clinical, while in advance of this there should be didactic and laboratory instruction. From this school the future orthodontist should pass to the dental infirmary. The balance of instruction must come from his own office practice.

The Difficulties and Complications of Dentition and Their Management. J. D. Leebron (Philadelphia). The American Physician, August, 1921, xxvi, 8.

The author, who is a pediatrist, first gives a résumé of primary and secondary dentition. He has often seen irregularities in the appearance of the temporary teeth in healthy children, including precocious and retarded dentition, the range being three to fifteen months for the first eruption. Breast feeding was not a factor. Usually, however, we associate constant irregularity with one of several diseases—rickets, marasmus, scurvy and inherited syphilis. In a case of teeth present at birth, one which was extracted proved to be no tooth at all, having neither root nor enamel. It is sometimes wise to extract these formations because they are both abnormal and interfere with nursing. One could hardly make a rule to this effect, however, because nursing is not always interfered with and these precocious teeth may at times be normal.

In regard to diet it may be stated in a general way that a one-sided diet, too little mineral or too little animal food, will surely manifest itself on the quality of the teeth. Not only will they disintegrate early but complications may arise. The author claims the existence of a causal relationship between maternal renal disease during gestation and abnormal dentition in the child. Of the so-called complications of dentition the author recognizes stomatitis, diarrhea, gastritis, convulsions, cough, otitis media, dysphagia, dysphonia and iritis, the last four being unusual. By far the most important is convulsions. The mechanism in the author's experience is a reflex, although the immediate cessation which has followed lumbar puncture suggests that some other factor may be present. This resource may be used when death is threatened.

The author's management of primary dentition is as follows: A cold alkaline mouth wash is usually well borne, as a teaspoonful of bicarbonate of soda in a tumbler of water. The best local application to the gums consists of potassium bromide, grains xx; chloral hydrate, grains x; tincture of aconite root, minims x; spirits of chloroform a drachm, and enough mucilage to make an ounce. This may be rubbed on frequently. The infant may bite on an ivory ring and the gums may be lanced. The bowels may be kept open by mineral oil, one teaspoonful two or three times daily. One or two grains each of extractum pancreatis, taka-diastase and sodium bicarbonate should be given combined if gastric disorders appear. Nervousness should be combated with strontium bromide and if convulsions supervene inhalation of chloroform should be added. Another resource, especially in refractory cases, is

high colonic irrigation with an enema containing sodium bromide, grains v, with one grain of chloral. Still another anticonvulsive is a hot mustard bath. Finally if all else fail lumbar puncture should be practiced.

Local Anesthesia in Dental, Oral, Nose and Throat Surgery. H. E. Tompkins (New York). New York Medical Journal, Oct. 12, 1921, cxiv, 8.

The sole analgesic considered by the author in this paper is procaine. which word is the American name for the German product novocaine. Natural suparenal extract is invariably added to solutions of procaine, the optimum being 1 part to 40000-50000. In order to discount the nervousness and apprehensiveness of the patient the author makes a rule to give bromides or an opiate half or quarter of an hour before operation—30 grains of triple bromides, 5 to 10 grains of bromural or a quarter grain of morphine, the latter a quarter hour before intervention. The technics of preparing the solution are elaborate. It is best to employ sterile Ringer's solution as the solvent. This is extemporized for each anesthesia. Only distilled water is used and this is boiled and the Ringer tablet added. The solution is again boiled, and when thus prepared may be suitable to use for about a week when spore formation will begin, but apparently he does not recommend this conservation. Thus far we have only the Ringer solution. The procaine and suprarenine are now added separately and after addition of the former the solution is boiled a third time. These consecutive boilings are not primarily in the interest of sterilization alone but to assist in dissolving the chemicals. The suprarenine is added while the solution is still warm and the latter is allowed to cool somewhat before injection. Directions for the preparation of syringes and needles are too long to quote, and the same is true for the technics of dental analgesia and blocking the inferior dental. These are reduced to a tabulation, however, and the reader might do well to obtain a copy of the latter from the journal or perhaps the author can supply it.

Rontgenographic Findings in Toothless Mouths. Eustermann (Mayo Clinic, Rochester, Minn.). The Dental Cosmos, September, 1921, lxiii, 9.

During the five months ending June 1, 1921, the author has examined 289 patients with completely or partly edentulous mouths in connection with ordinary routine work. During the past 16 months he has examined 11,000 patients for dental troubles, and made the discovery that root extraction, far from eliminating a focus of infection, may in itself light up septicemia. Up to the time of extraction, there had been practically no trouble. The 289 edentulous patients were all presumably ill of some affection, the diagnosis of which had been made before examination of the teeth. The diagnoses are sometimes doubtful and the connection of the teeth with focal infection is not apparent. Only 41 of the 289 were wholly without teeth. It is not extraction *per se* that lights up the sepsis but improper extraction in which the osseous tissues are compromised. The large infected focus at the apex of a tooth is no more provocative of focal infection than the matter within the cavity of the tooth and its root. Of the 289 patients examined 201 gave negative radiograms. In 89

patients there were persistent roots and in all cases the same contained matter infectious to animals; there was therefore no necessity for examining the tissues at and about the apices of the roots.

Crises of Toothache Following Absorption of Bismuth Subnitrate Taken for Ulcer of the Stomach. J. Estoule. La Semaine Dentaire, October 16, 1921, iii, No. 42.

The practice of giving large doses of bismuth subnitrate for gastric ulcer is commonly regarded as harmless. As much as 1600 gms. have been given in 48 hours without any detrimental consequence. In rare cases of gingivitis and stomatitis following its use impurities have been accused, as lead and arsenic. Nevertheless a fraction of the bismuth ingested is eliminated through the saliva, so that when taken over a long time there is a possibility of buccal irritation from the bismuth itself. The author while treating a case of gastric ulcer by the Fleiner-Mathieu method gave the bismuth salt in two daily doses of 10 gms. each. These doses were given with a large glass of water and as far as possible on a fasting stomach. Even the day following the first doses the patient complained of severest toothache referred to the molars and persisting two hours. The teeth were found to be in perfect condition and there were no other symptoms, buccal or otherwise. The bismuth was not repeated until several days had elapsed, when the doses were resumed and on the following day there was another crisis of odontalgia. There had been no suspicion of the bismuth as yet and the author's original intent had been to give the drug but twice weekly. The author is entirely unable to explain why bismuth could set up these neuralgia-like paroxysms, nor can he account for the localization in the molar teeth nor the subsidence of the pain while the bismuth was still in the system. The presence of gastric ulcer may have in some way made possible the phenomenon, which seems to have been quite unique in medical literature.

Tooth Infection. Oliver T. Osborne (New Haven). New York Medical Journal, October 14, 1921, cxiv, 8.

The theoretical indications are very plain in tooth infection and the only debatable question is how to fill them—how to remove the infectious material. It could be done radically at a single effort under narcosis or gradually in a number of sessions with the possibility of doing more harm than good. The author would not advise conservatism save in cases where the mouth as a whole is in fair health. This means that in the early stages of pyorrhea, for example, it would be well to save the teeth. This must be before there has been much burrowing below the gum line. Putrescence in the mouth is the author's strongest argument for proceeding radically. This putrid material may be in a pocket, under a gold attachment, in a tooth canal, etc. This element does not show on a radiogram. No patient who has once sampled the odor of putridity would ever consent to retain such matter in his mouth. It may happen that this is left behind while some innocent formation which makes a shadow on the plate is removed. The dentist is often tempted to

relieve only the condition for which his aid is sought and make other necessary repairs, without taking the further responsibility of extractions, removing gold attachments, etc. In many cases to do so might be to condemn his own work. Nevertheless in these cases he is not acting for the best interests of his patients or doing as he would be done by, and he should never leave behind any of these foci of putrid matter and, as often happens, infection due to the same.

Fatal Poisoning of a Dentist with Arsenic from Filling a Tooth. A. Lichtwitz. Zahnaerztliche Rundschau, October 4, 1921, xxxi, 40.

At 7 P.M. on a certain day as the dentist was about to leave for a social function, he filled a cavity in a molar tooth with arsenical paste to relieve toothache. The pain was relieved and the dentist left without giving the matter another thought. He ate, drank and enjoyed himself. At 2 A.M. he experienced nausea and left for home. Incidentally he found that the arsenic paste was no longer in the cavity; doubtless it had come away while chewing and had been swallowed. He had vomiting and diarrhea during the night and in the morning was unable to rise. In the afternoon he was found in collapse and also in great abdominal pain. His mind was clear and he made the diagnosis for the attending physician. During the night the picture of arsenical poisoning was fully developed. Patient presented anuria, violent pains in the calves, great thirst and a remarkable agreement with the syndrome of Asiatic cholera. He had of course been removed to the hospital where everything was done to overcome the collapse and remove the poison from the organism. He lived nearly four days after the accident. There is no mention of an autopsy. An attempt was made to determine the fatal dose of the arsenic in the paste which had been swallowed in association with two other ingredients, cocaine and carbolic acid. The entire mass was the size of a pea. The arsenic was estimated at $^{115}/_{1000}$ of a gram, equal to about 1.7 grains—about 23 times the safe limit. The amount of cocaine was twice that sanctioned by authorities and only the carbolic acid had been present in the proper quantity. The mass of the paste used by the deceased should not have exceeded that of the head of a common pin. Some use only half this quantity.

Pulpless and Vital Teeth. Their Relation to Disease. By H. C. Moxham (Sydney). The Medical Journal of Australia, August 27, 1921, viii, 9.

The author begins by alluding to the manner in which the American dental profession became obsessed some years ago as to the menace of dental focal infection. From 1917 to 1919 there was an era of indiscriminate extraction which has somewhat abated. In a large percentage of cases extraction did not benefit the alleged system infection. In another fraction it is by no means certain that benefit was due to removal of a dental focus of disease. In other cases there could be no reasonable doubt that removal of a pulpless tooth had caused a notable and rapid cure.

The author lays down rules for the selection of pulpless teeth, the removal of which would probably cure the patient of some malady. Untreated

pulpless teeth should, of course, be treated and if they do not respond an x-ray should be taken and if a granuloma is undoubtedly present the tooth should come out, although sometimes an apicectomy answers. In regard to filled teeth the x-ray is untrustworthy as to the completeness of root fillings unless some special material is used for the purpose of becoming radiographically visible, as bismuth oxychloride. It is impossible to judge without x-raying but interpretation is often difficult and erroneous and the patient will not go to the expense. But at least 80 per cent of modern filling is both clinically and radiographically correct so that doubtful cases are in the minority.

Fatal Case of Buccal Gangrene Following an Extraction. Kritschevsky and Seguin (Paris). Revue de Stomatologie, August, 1921, xxiii, 8.

This case is not only of great interest *per se* but raises the question of the identity of the case with noma. The patient was a man of 45, referred by the dentist consulted to the authors as a case beyond his practice. He was seized with symptoms of gingivitis and loosened teeth and in addition there appeared a swelling of the lips and cheek. The character of the pain suggested a pulpitis. The dentist in question pulled an incisor but the symptoms deterred him from any wholesale extraction. The condition originally present was aggravated and the dentist referred the subject to the Stomatological Department.

The status of the patient indicated severe infection of the buccal cavity terminating in gangrene of the soft parts with regional adenopathy. The clinical history, while inconclusive, was questionable. There was a past of alcoholism, of a dozen of small potations in the forenoon, etc. The authors would have made injections of salvarsan had the subject been more robust; instead they were limited to mouth-washes. After considerable delay a root was extracted and this seemed to aggravate the condition. A surgeon was summoned but he would not intervene and death occurred a fortnight after the first onset of the disease. The microscopist found an abundance of spirochetes and some fusiform bacilli, so that from this angle the case was a Vincent gingivitis; but the clinical diagnosis was noma, although the necrosis seems to have been limited to the right upper gum.

Study of Dental Caries. Stanley Colyer. The Dental Record. October 1, 1921, xli, 10.

There is agreement among authorities on at least one point in the causation of caries, to wit, that it is due in some way to food. It is not entirely true that primitive and ancient people are always immune, for while this applies to many races some like the ancient Bushmen suffered from it and more than do the most civilized African races. This is shown by examination of skulls. But in these researches ordinary enamel caries is understood, and no account is taken of caries of the cementum or caries of the crown which follows certain injuries; for naked dentine when exposed readily decays. Again slow destruction of roots is not the same thing as ordinary caries. From his experience with African natives the author can state that the immunity of savage tribes

to ordinary caries is soon lost, when they begin to live like Europeans. This immunity depends on the condition of the enamel, hence some alteration evidently takes place in that structure. The author believes that the state of the saliva plays little part in the etiology of caries, while familiar with Pickerell's claim that there are at least eight ways in which this fluid can contribute to the condition in question.

The author discusses the relationship between food and caries. The original way of softening food for the table was by allowing it to rot, which was succeeded in time by cookery. This latter was doubtless a powerful modifier of the functions of the intestinal tract which was originally geared for hard food save when fruits, flesh, etc., were obtainable. Milling obtained starchy substances and eliminated some of the indigestible residue and a few articles like sugar were obtained by extraction. Food comprises fresh and dried staple articles and opportune materials, the latter being used chiefly among nomadic races.

Food is the ultimate cause of caries but the mechanism continues obscure. The next obvious factor is the presence of enzymes thought to be of bacterial origin which are acid-formers. But in almost all tropical countries the primitive inhabitants use much sour milk, etc., which is of similar origin, yet causes no caries by reason of some immunity of the enamel. In man the presence of easily fermentable carbohydrates is thought to be an important factor. The theory of "soft food" as a cause evidently is the same as the "absence of use" theory, and the author barely mentions it. It is probable that the immune subject is one whose mouth is free from fermentable carbohydrate, whether from the character of the food, the habit of eating, the care of the teeth, etc., so that immunity is to a certain extent accidental and hence may occur alike in the primitive and highly civilized.

ORTHODONTIC NEWS AND NOTES

The editors desire to make this department a permanent feature of the Journal, but in order to do so must have the full support of the orthodontic profession throughout the country. We would deem it a great favor if our subscribers and readers would send in such announcements as might be of interest to the profession.

Meeting of the American Society of Orthodontists

The next meeting of the American Society of Orthodontists will be held in Chicago, Illinois, at the Edgewater Beach Hotel on April 24, 25 and 26, 1922. A very interesting and instructive program has been arranged by the Board of Censors, consisting of Clinics, Case Reports and Papers of unusual merit. Reservation should be made early in order to secure the best accommodations.—Ralph Waldron, Sec.-Treas.

Meeting of Kentucky State Dental Association

The next annual meeting of the Kentucky State Dental Association will be held in Louisville, Kentucky, April 10, 11, 12, 1922, Seelbach Hotel as Headquarters. A clinical program of unusual interest is being arranged. Address all correspondence to W. M. Randall, Secretary, Louisville, Ky.

The American Society of Dental Radiographers

The American Society of Dental Radiographers will meet at Drake Hotel, Chicago, Illinois, on January 18th, 1922. A scientific program of unusual interest has been prepared, besides the transaction of important business matters. All interested in Dental Radiography are invited to attend. H. C. McKittrick, Pres., I. O. O. F. Bldg., Indianapolis, Ind. Martin Dewey, Sec.-Treas., 501 Fifth Ave., New York, N. Y.

American Institute of Dental Teachers

The Twenty-Ninth Annual Meeting of the American Institute of Dental Teachers will be held at the Windsor Hotel, Montreal, Quebec, on January 23, 24, 25, 1922.

An interesting program has been arranged, built around the theme of Preventive Dentistry and its correlated subjects: What, When, How and Why to teach. There will also be a complete exhibit of scientific teaching apparatus, college equipment, etc.

All interested in dental teaching are cordially invited to attend. Guy S. Millberry, President. Abram Hoffman, Secretary-Treasurer. 381 Linwood Ave., Buffalo, N. Y.

New York Society of Orthodontists

The organization meeting of the New York Society of Orthodontists was held at the Academy of Medicine, October 20. The following officers were elected: Dr. J. Lowe Young, New York City, President. Dr. Herbert A. Pullen, Buffalo, N. Y., Vice-President. Dr. William C. Fisher, New York City, Sec'y-Treas.

Dr. Young then appointed a committee to adopt a Constitution and By-laws, making Dr. Leuman M. Waugh, of New York City, chairman of that committee. The president also appointed a committee on arrangement to provide for the next meeting. Doctor Joseph D. Eby, of New York City, was named chairman of the arrangement committee.

The first regular meeting of the New York Society of Orthodontists will be held at the Hotel Vanderbilt on Thursday, December 8. The program consists of a business session in the afternoon, at which time a report of the committee on Constitution and By-laws will be received and acted upon. The evening session consists of a dinner, followed by three twenty minute addresses, "Ideals and Orthodontia," by Dr. Milo Hellman, "Looking Both Ways After Twenty Years," by Dr. Martin Dewey, and "The Outlook," by Dr. Leuman M. Waugh.—President, J. Lowe Young, 8 West 74th Street, New York City. Secretary-Treasurer, William C. Fisher, 501 Fifth Avenue, New York City.

Notes of Interest

Dr. Hamilton D. Harper announces the opening of his offices, Suite 501-3 Hutchinson Bldg., Shreveport, La. Practice limited to orthodontia.

Dr. Winston P. Caine announces the opening of his offices, Suite 623-5 Volunteer Bldg., Chattanooga, Tennessee, for the practice of orthodontia.

Mr. Harold Chapman begs to announce that on and after November 1, 1921, he will practice orthodontia exclusively. 15 Upper Wimpole Street, London, W. 1.

Dr. Joseph D. Eby, formerly associated in practice with Dr. V. H. Jackson, now announces his location, 54 E. 62nd St., New York City, N. Y. Practice limited to orthodontia.

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SUGGESTIONS TO CONTRIBUTORS

"The four rules for the preparation of an article will then be: (1) Have something to say; (2) Say it; (3) Stop as soon as you have said it; (4) Give the paper a proper title."[1]

Let your phraseology express one meaning and one only. Be clear.[2]

Manuscript.—Manuscripts should be typewritten, with wide margins, and double spaced, on one side of paper 8½ by 11 inches in size. The original copy should be sent to the "Journal" and the carbon copy retained by the author. Number the leaves consecutively, beginning with the title page. Put your name and address on the manuscript.

Illustrations.—Illustrations should be clear, preferably pen-and-ink drawings. Of photographs send a good print rather than a negative. Have lettering parallel to the bottom and top margins, and of sufficient size to be clear if cut is to be reduced. Tracings should be in black-and-white; avoid colors. Write your name on back of each picture; number them in one series (Fig. 1, etc.) to the end, and indicate in margin of the manuscript about where each is to be printed. See that the text references and "figures" correspond. Legends for illustrations should be written on a separate sheet.[3]

Bibliographic References.—Give only references actually consulted. If an article is known only through an abstract give reference to the abstract in addition to that of the source. References are printed to be of help in further reading; therefore they must be complete, concise, and correct. Follow the style of the "Index Medicus" and "Index-Catalog of the Library of the Surgeon-General's Office." Be conservative in the use of abbreviations.[4]

Arrangement.—As authors are quoted in the text give each a number in the order of citation, and number the bibliographic reference with the same number. Arrange the references in a list at the end of the article in the order of the numbers (see below), or arrange items in alphabetical order according to last names of authors, and distinguish between articles by the same author by the use of the date after his name in the text.

Footnotes.—Where an author wishes to use footnotes at bottom of each page instead of the bibliography at end of article, the footnotes should be written in the text, but separated from it by horizontal lines above and below, or *better,* place them at bottom of each page. Use figures to indicate these footnotes, and number consecutively (1, 2, 3, etc.) throughout the article. If in addition to the bibliography mentioned above it is desired to use footnotes on certain pages, these can be indicated by an asterisk (*).

Final Reading.—Let some one other than the author read the manuscript with these directions in mind.

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References. (Read these.)

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"Since 1844 the Standard"

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An Extensive and Diversified

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The *Clev-Dent* trade mark is placed on a very extensive line of dental products including instruments of standard forms which have long had the approval of the profession as well as new and exclusive designs recently developed by those forward-looking men of the profession who look always for some better way to perform the needed operation. In addition to Operative and Exodontia instruments, the Clev-Dent line includes many appliances and materials of every day use, all made with careful attention to quality and with due thought for the value of the dentist's time. These are shown in a catalog of one hundred sixty pages, classified as follows:

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THE CLEVELAND DENTAL MFG. CO.

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ADERER'S No. 4

WITHOUT AN EQUAL FOR DELICATE,
YET STRONG, ORTHODONTIC APPLIANCES

BEWARE of defective wire. Labial or lingual arch wire ***must*** be of dependable material, the kind that will withstand, without breaking, the bending and rebending of the lingual arch. This inherent quality is of importance—as it avoids the misfortune, trials and tribulations of replacing broken wire. Dependability is one of the many outstanding points of superiority orthodontists have found belonging preeminently to Julius Aderer's No. 4 Platinum-Gold lingual or labial arch wire.

As an auxiliary to the lingual or labial arch, so-called finger springs of a gauge approximately .022 or .023 of an inch thick wire are often used. If the lingual arch or any of these finger springs break on account of defective wire, it becomes a troublesome affair to remove the appliances and fasten others. It, in short, is much simpler in the beginning, as well as much more satisfactory in the end, to use Aderer's No. 4.

For Band Material, for Anchor Teeth, as well as Anterior Teeth, NOXIDIUM is recommended for the following reasons: It is fully as strong and more reliable than 10% Iridio Platinum; it is infusible, except in the oxy-hydrogen blowpipe; and will not oxidize either in the flame or in the mouth.

Manufacturers of Orthodontic Appliances since 1906 and the FIRST to introduce Platinum-Gold for use in Orthodontia.

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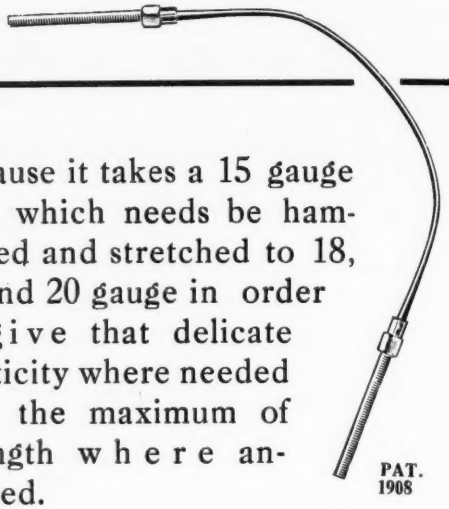
Julius Aderer's Ideal Expansion Arch Aids Scientifically



PAT. 1908

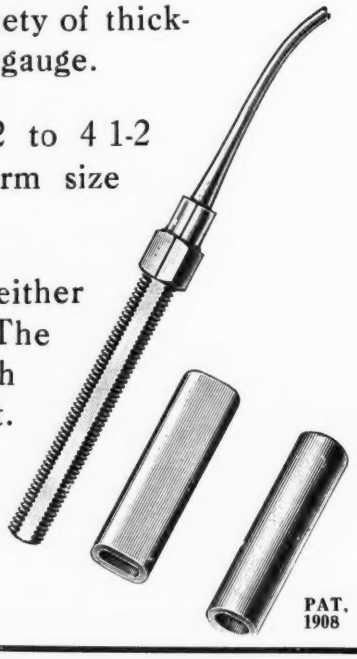
Because it takes a 15 gauge wire which needs be hammered and stretched to 18, 19 and 20 gauge in order to give that delicate elasticity where needed and the maximum of strength where anchored.

Ideal Arches come in a variety of thicknesses of wire—18, 19 or 20 gauge.

A variety of sizes from 3 1-2 to 4 1-2 inches long, all with uniform size threaded end sections.

Threaded end sections fit either round or flat buccal tubes. The round allows the anchor tooth to be tipped; the flat does not.

The split adjusting nut stays where the operator's wrench puts it.



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Platinum-Gold $3.60 each
New Gold Alloy, $1.50 each

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The ORTHOANEALER

Patent Applied For

Illustration one-half the actual size

THE Aderer Orthoanealer is *the* inexpensive yet effective tool for *evenly,* thoroughly and quickly heating and tempering platinum-gold wire or finished orthodontia appliances.

The removable monel metal wire screen disc prevents the flame of the Bunsen burner from melting the orthodontia wire or appliance; at the same time sufficient heat reaches the article so that a few seconds exposure over the Bunsen burner thoroughly anneals arch wire, finger springs, etc.

The three inch monel metal disc on which the appliance or wire rests, absorbs but very little heat, unlike an annealing pan, which becomes red hot itself before the article contained therein reaches that stage.

Price of Orthoanealer with one monel metal disc, $1.50

No. 4 WIRE

and the Orthoanealer

Julius Aderer's No. 4 Platinum Gold Wire, the accepted standard for delicate yet strong orthodontic appliances yields more readily to softening and tempering than any other wire made for the same purpose.
Plunged into water while red hot makes Aderer's No. 4 pliable and soft; heating and allowing it to cool slowly restores the original temper and the piano-wire-like elasticity. You do this quickly and effectively with the use of the Julius Aderer Orthoanealer. Order today.

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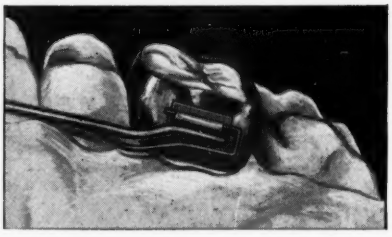
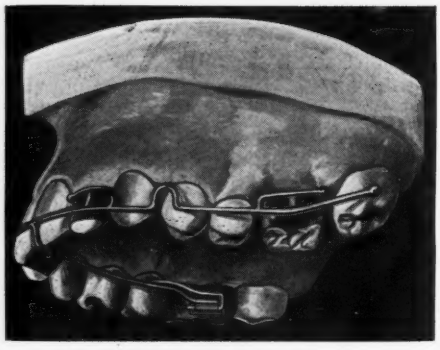
A NEW LOCK

FOR REMOVABLE

LINGUAL AND BUCCAL ARCH WIRES

DESIGNED BY L. J. PORTER, D.D.S.





We make the Dr. Porter Lock complete in Precious metal and Non-precious metal. Price on application. We also make round, half-round, elliptical, square, and rectangular tubes and shafts, used in orthodontic treatment.

ORTHODONTIC APPLIANCES AND SUPPLIES

OF EVERY DESCRIPTION

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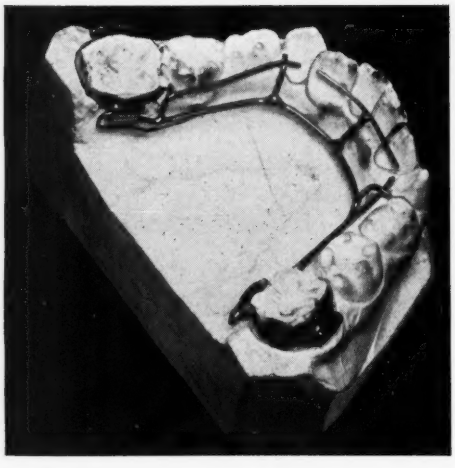
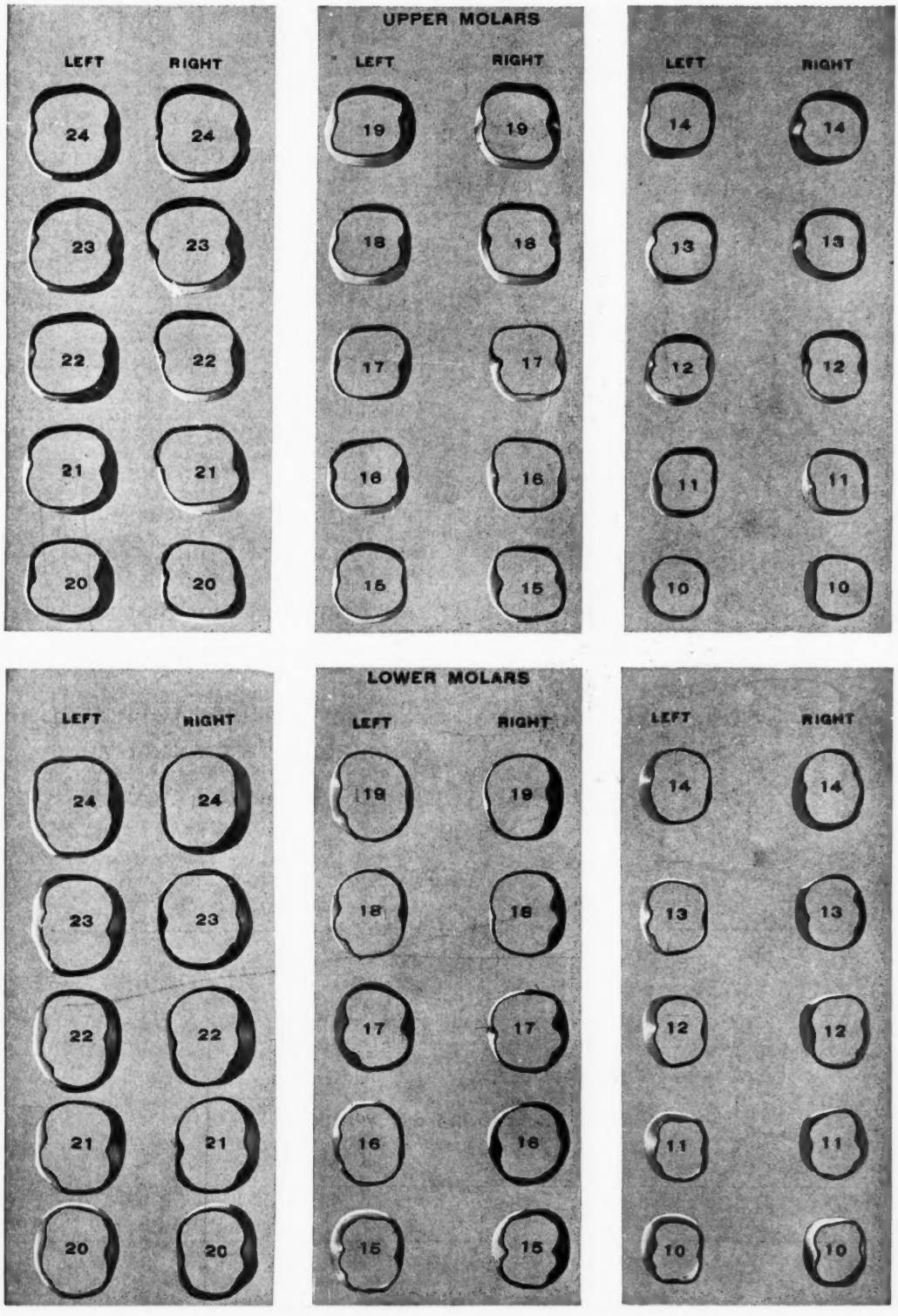


BLUE ISLAND SPECIALTY CO.

BLUE ISLAND, ILL., U. S. A.

BLUE ISLAND SPECIALTY CO.
CONTOURED SEAMLESS MOLAR BANDS



ANOTHER
Fischer Masterpiece

There never was such value in X-ray equipment: either before or after the war.

A complete equipment with all modern devices, and several FISCHER additions for your efficiency—at a price which will astound you.

Another proof of the "a year ahead" idea.

Mail coupon today for complete description and price.

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Please tell me about the New Type "R."

(Int. Jr. Ortho.)

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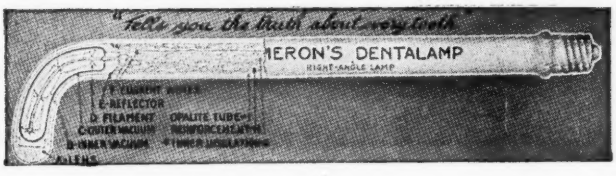
Don't attach an Orthodontic Appliance to an infected tooth

In the attachment of Orthodontic Appliances

Cameron's Dentalamp

furnishes a certain and immediate method of determining whether or not the teeth are infected.

You can clearly transilluminate the entire alveolar process with Cameron's Right Angle Dentalamp shown below. Healthy areas are always clearand translucent.



In transilluminating the dental process, you do not see shadows from the roots of teeth. If you cannot see shadows from the roots of teeth, you cannot see shadows from anything within the root canals. When you find shadows in the alveolar process, they indicate a pathological condition, and are not caused by chemicals or root canal fillings.

In other words, when a shadow is present, it is caused by one thing only, and that is infection. We have proved this by extraction in more than 1000 cases where shadows were found with the 100 candle-power Cameron's Rig h Angle Dentalamp at the Chicago College of Dental Surgery.

Cameron's Dentalamp also furnishes you with all the clean, cool light you want in the patient's mouth, and a life-time of service and satisfaction.

You can prove its value to you in your work without risk by taking advantage of the TEN-DAY (money back if not satisfied) FREE TRIAL OFFER. Our book "Diagnosis by Transillumination" explains the technique and is provided FREE with the outfit.

The complete Cameron's Dentalamp (Cool X-Raylite Model) includes Potential Reductor Unit for either alternating or direct current, Eight-foot silk covered Cord with Connections, two straight Dentalamps, two Right Angle Dentalamps, two Detachable Mirrors, all packed in velvet lined Fabrikoid carrying case.

110-Volt Std. Screw Socket Model, $30.00

220-volt Std. Screw Socket Type $35. For Delco or Similar Sys. $35 (U. S. Army Field Service Model) Standard Batteries.....$20

Foreign "Bayonet Socket" Type
110-volts..$35.00 220-volts..$40.00

YOU TAKE NO RISK. FILL IN AND MAIL THE COUPON NOW.

I.J.O.-921.

American Surgical Specialty Co.
Suite 508,
6 East Lake Street,
Chicago, Ill.

Please ship at once as checked below on TEN-DAYS TRIAL, one complete Cameron's Dentalamp (Cool X-Raylite Model), and one copy of book "Diagnosis by Transillumination."

If not entirely satisfactory to me, I may return the outfit at the end of ten days at your expense, and you hereby agree to refund the full amount paid.

Check enclosed for $30.00..... ☐
Send Outfit C.O.D..... ☐

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Address.....
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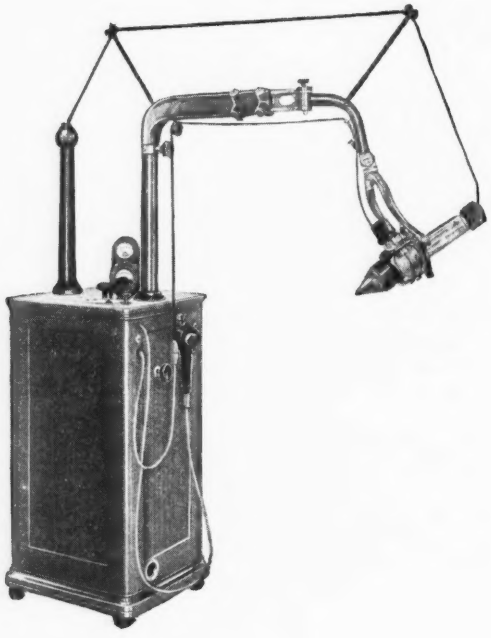

"1921 Will Reward Fighters"

is the slogan adopted by one of the great metropolitan newspapers.

This year and every year to come will reward the Dentist who plans and equips his office so that he can take advantage NOW of the most favorable conditions that have ever confronted the dental profession.

The public is educated to its need of a larger and better Dental Service—Are YOU Prepared to render it?

A Dental X-Ray Unit is indispensable if your office is to meet the public demand for complete dental service. Modern equipment and up-to-date office arrangements will save your time and demonstrate to your patients your progressiveness as a Dentist.

Catalogs and Office Planning Helps gladly sent upon request.

RITTER DENTAL MFG. CO., Inc.
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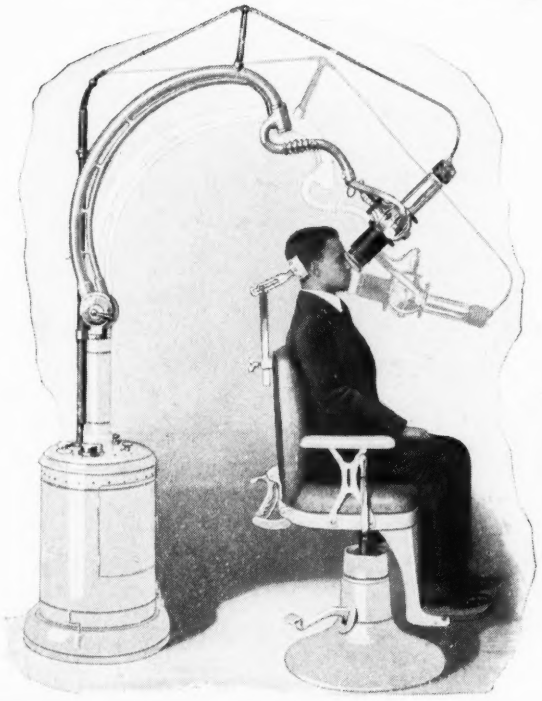
H-210

Designed for Complete Satisfaction



EVERYONE has the right to be satisfied—not only with the results obtained with an X-Ray Unit but with the convenience and safety of its operation.

The Engeln Dental X-Ray Unit with its complete scientific construction assures this satisfaction to the user. The overhead arm with the Coolidge Dental Radiator Tube may be adjusted to any position rapidly and accurately. The electrical features give the user full protection and convenient operation.

The cost is very reasonable and our service complete. May we send you further literature?

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4607 Euclid Avenue **Cleveland, O.**

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THE PROBLEM OF HYPODERMIC NEEDLES WILL BE SOLVED

IF YOU USE—

A. P. W. 30% Iridio Platinum with our removable platinum alloy safety and regulator guard.

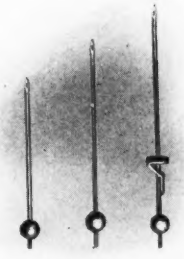
A. P. W. Needles are efficient, economic and durable.

A. P. W. Needles can be sterilized over the flame to a red heat, absolute sterility, no clogging, no wire trouble, no effort.

A. P. W. Needles are not soldered, can be used indefinitely with proper care.

A. P. W. Needles will not corrode or rust.

A. P. W. Needles always have an intrinsic value, easily repaired when broken.



Safety in operation and peace of mind is assured with our Platinum Alloy removable guard. This device will serve as a guide for deep injection, can be moved to suit the needs of the operator. Will facilitate the removal of the cannula if broken in operation.

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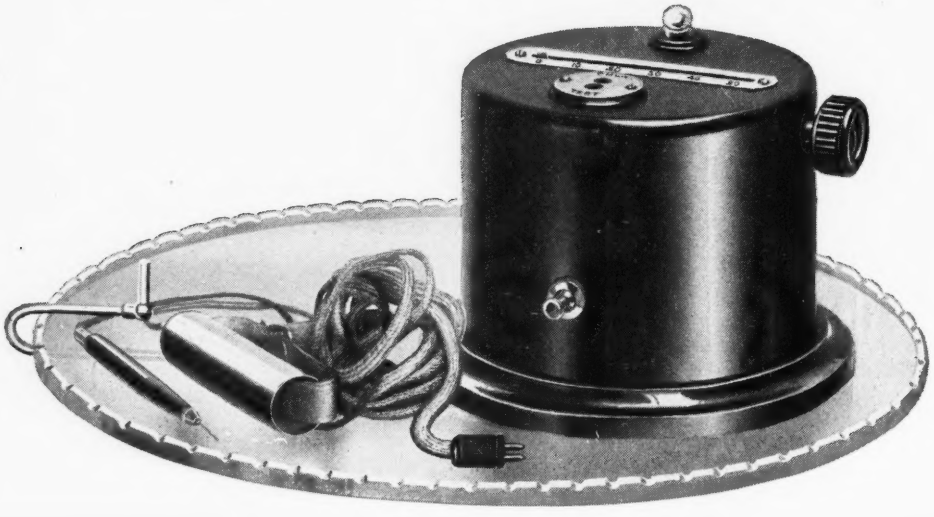
AMERICAN PLATINUM WORKS

NEWARK, N. J.

NEW YORK OFFICE, 30 Church Street

Reducing to the Minimum Uncertainty in Diagnosis



COLUMBIA PULP TESTER

For distinguishing vital from non-vital teeth

In a complete diagnosis of the mouth the electric test is second in importance only to the X-ray.

The technique of applying
this test is extremely simple.

You can test all the teeth in five to ten minutes, with certainty and without causing pain.

Operates from an ordinary lamp socket.

Ask your salesman about our *Special offer,* or write to us, mentioning your dealer.

Columbia X-Ray & Electric Corp.

432 Austin Place, New York City.

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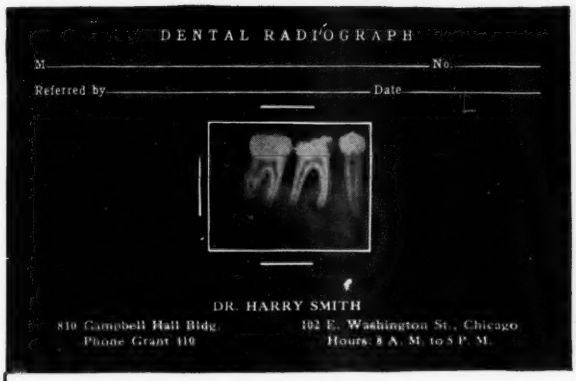

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Black or Gray Card—with Celluloid Window

Prices include printing with your name, office address, etc.

	Price per 100	200	300	500	1000
For 1 film.....	$ 3.80	$ 6.25	$ 8.60	$13.00	$25.00
" 2 "	4.50	7.25	10.00	16.00	30.00
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" 4 "	7.00	12.50	17.00	25.50	48.00
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Dental X-Ray Films and X-Ray Plates in stock for quick shipment, also a wide line of other X-Ray supplies.

Send for complete price list with discount sheet.

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DENTAL X-RAY SUPPLIES

ONLY 2 OF OUR COMPLETE LINE

Everything needed for finest dental X-Ray work. Prompt shipment. Low prices—and Technical advice when desired.

X-OGRAPH FILMS

New low price, 75c per dozen

LEAD SAFETY BOX

For Protecting Films from Fogging
Something New, $6.00

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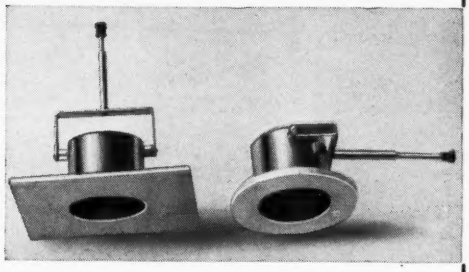

For getting the correct distance and angle quickly. Focus direct on infected tooth, then swing pointer over while exposing. Simplifies your work. Furnished in different style bases to fit the various makes of tube stands. Price each $6.00

Two-Compartment Glass Developing Tank, $1.50
Single Developing Clips, per dozen..... 1.25
Developer, 20-ounce size ..... .30
Acid Hypo Fixing Bath, half-gallon size..... .25

Achievement is the child of effort

and in Alloy "J" we have achieved.

This material, rich in Platinum, Palladium and Gold, is the result of painstaking research, entered upon to evolve an alloy for orthodontic use that would exhibit the maximum of resilience and retain it to a greater degree than had been thought possible hitherto, even after exposure to the heat of soldering or that developed in casting against it.

Our laboratories succeeded in solving this very difficult problem and so, we are mighty proud of Alloy "J".

Alloy "J" Wire will be found most satisfactory and altogether dependable because of its permanent springiness and all-round reliability. After you've used it you'll agree that we have not overstated its goodness.

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BAKER & CO., INC.

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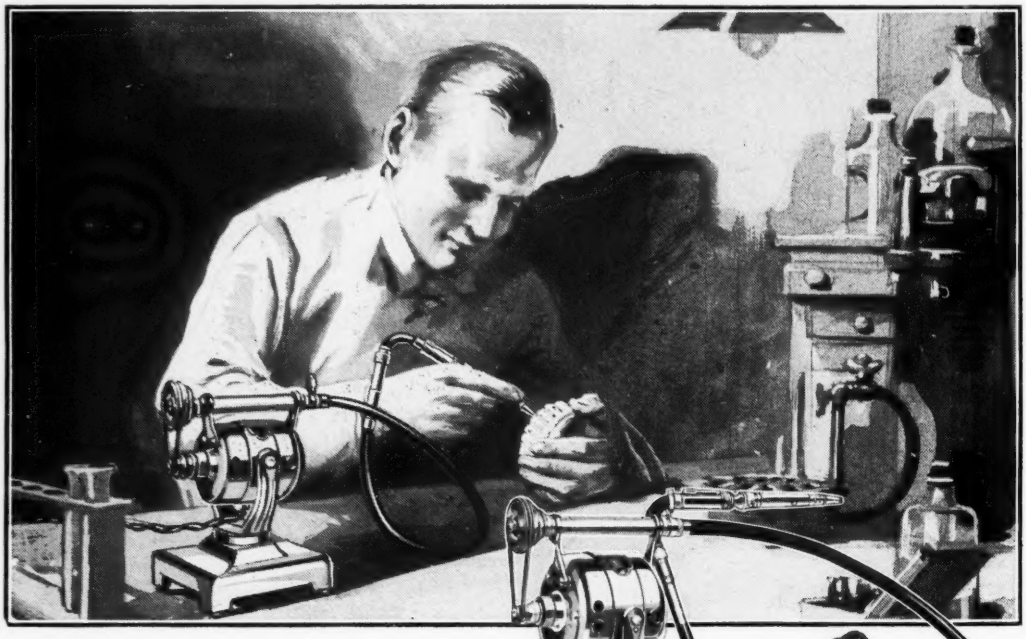
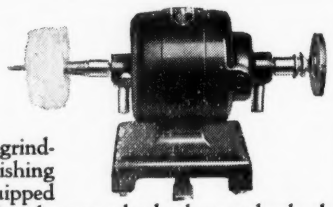


The Engine For Your Laboratory Or Extra Chair

When you decide to equip an extra room so that you can serve more patients each day you will appreciate the Dumore Dental Engine. It is capable of doing everything that is expected of the regular dental engine and may also be used for laboratory work of all kinds. Its portability makes it doubly useful—it weighs only 7 pounds.

For emergency calls, the Dumore can be taken to the operating room or bedside, enabling you to give exactly the same degree of attention and service that you could give in your office. A few calls of this kind will quickly pay for the engine.

Type D
⅛ H. P.
Lathe



For laboratory grinding and polishing work. Equipped with 8-ft. cord and p ug, wheel arbor and wheel, with five speed rheostat in base. Black enamel finish

See your Dental Supply Dealer or write

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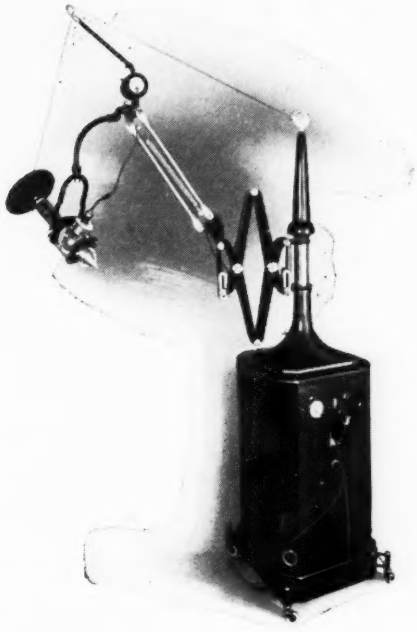
DUMORE DENTAL ENGINE

INTERNATIONAL

A MARK OF QUALITY *A SIGN OF SERVICE*

SELF-RECTIFYING X-RAY TUBE UNIT

Dental Type



The use of X-Ray in the Dental Profession has established itself as an absolute necessity for aiding in the diagnosis of existing conditions. There are other means for diagnosis but the confirmation of findings by use of the X-Ray should be resorted to in practically all cases.

Owing to the extensive use of X-Ray apparatus and with the limited time of the professional man as an important factor the International Dental Unit was designed to obtain perfection in manipulation for angles and in operation but no sacrifice was made in the Dependability, Durability, Simplicity and Flexibility.

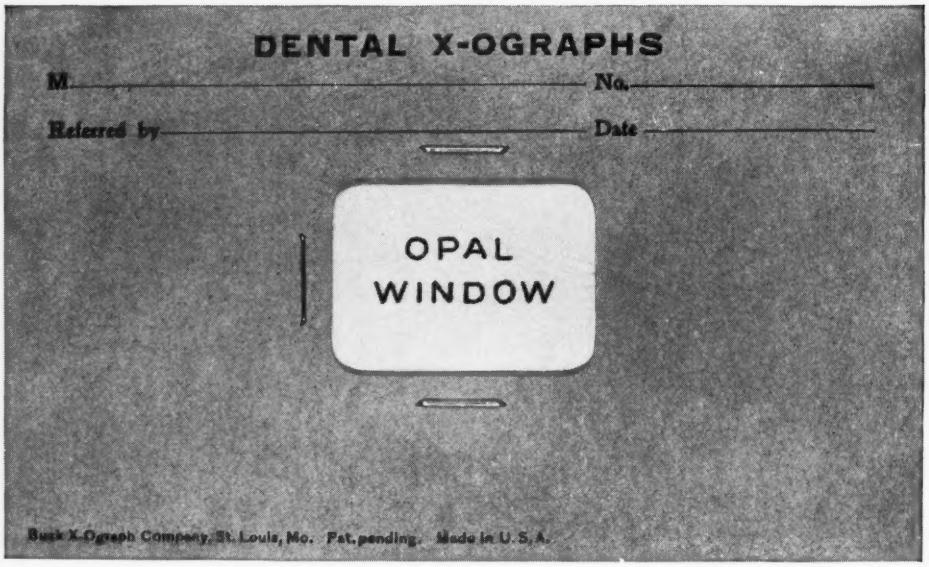
Quality with Economy are incorporated in all International Products.

If ordered for operation from rear of Dental Chair, it can be furnished by slight change in castings used, without additional charge. The changes necessary convert the International Dental Unit into an apparatus with tube arm operating over patient's head.

INTERNATIONAL X-RAY CORPORATION

326 BROADWAY NEW YORK CITY

Sales Distributors conveniently located, capable of rendering the best of service.



YOU well know that opal glass with its wonderful preservation of delicate detail has long ago replaced the granular and easily scratched surface of ground glass in X-ray illuminators.

Why shouldn't the opal window replace the ground celluloid window of the present dental film mounts?

IT WILL

Write for free sample

Buck X-Ograph Company

6629 Olive St. Rd. **St. Louis, Mo.**

Why Millions Accepted

this new dentifrice so quickly

Pepsodent was created but a few years ago. Today millions employ it. Its effectiveness is apparent to every dentist—every day.

The reasons are: Modern authorities approve it. It complies with their requirements and avoids all their objections. Thousands of dentists who know the facts have aided in its adoption.

Produces six results

Millions who use Pepsodent several times daily obtain the six following results:

1. An increase in salivary flow.
2. Reduced viscosity of the saliva.
3. An increase in ptyalin—the starch digestant in saliva, to remove starchy deposits which ferment into acids.
4. An increase in alkalinity to neutralize acids which destroy enamel.
5. An attack on mucin plaque in an efficient manner.
6. High polish so that plaque cannot easily adhere.

These results are natural aids to Nature. Diet, rich in starchy foods and deficient in fruit acids, makes them necessary.

No soap—No chalk

Pepsodent contains no soap and no chalk. Any alkaline tooth paste brings opposite effects.

It contains nothing harmful. Six years of exhaustive experimentation and tests prove this.

Ask the Dental Department any questions. Write for scientific literature. Send the coupon for a tube to test and use at the chair.

PAT. OFF.
Pepsodent
REG. U.S.

A Modern Dentifrice

An acid tooth paste which brings six effects desired by modern authorities

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7507 Ludington Bldg., Chicago, Ill.

Please send me, free of charge, one regular 50c size tube of Pepsodent, also literature and formula.

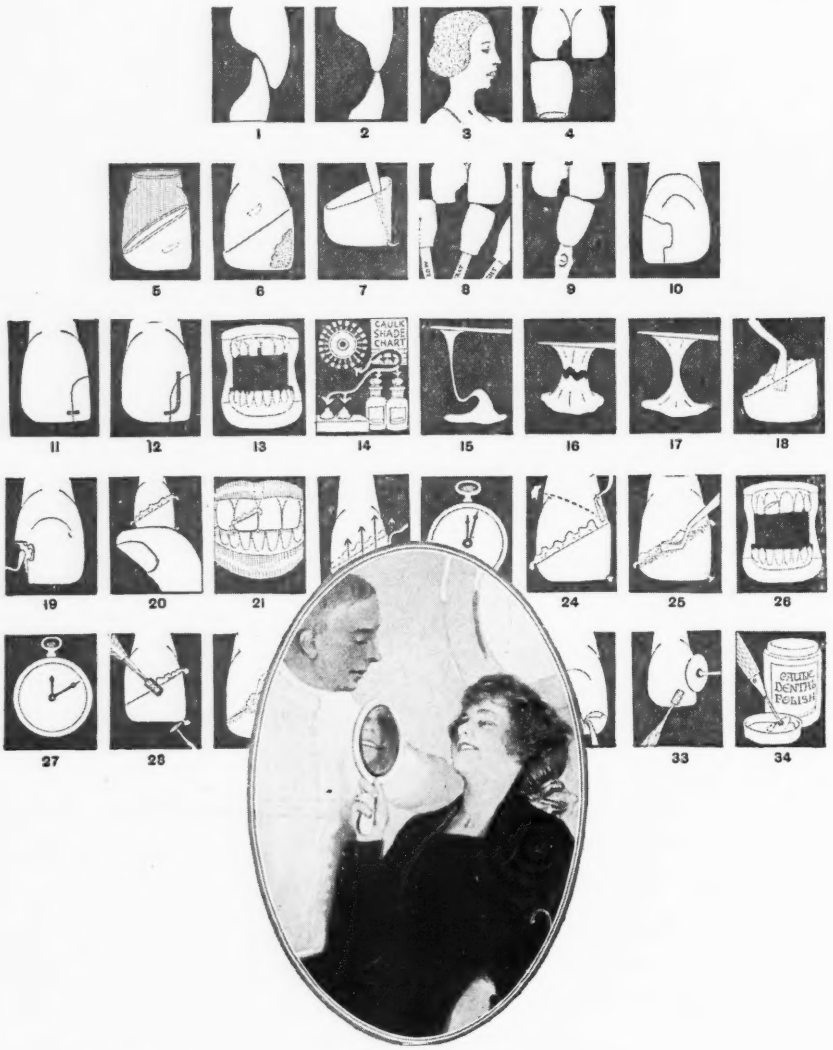
Name .....

Address .....

Enclose card or letterhead

Give your patients the benefit. Write for booklet of 34 pictures showing simplified technique for permanent incisal-corner restorations.

Address: THE L. D. CAULK CO., MILFORD, DEL.



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SYNTHETIC PORCELAIN

The Chemical Porcelain

distinguished from all ordinary silicate cements and enamels. STRONGER than any known cement, either dental or industrial

Eastman Dental Film Developing Cabinet

A convenient, portable dark-room, designed to meet the demands of dentists who wish to do their own work but have no dark-room space available.

The cabinet is a complete miniature dark-room with tank development, safe-light and provision for *circulating* water.

The Tank Unit

consists of an outer tank of Monel Metal containing two smaller Monel tanks with space between for washing. Four developing hangers are included, each holding ten dental films so that facilities are provided for accommodating a large amount of work if necessary.

PRICE

Eastman Dental Film Developing Cabinet and Tank Unit, complete

$75

Tank Unit, only, $25.

Eastman Kodak Company

Medical Division Rochester, N. Y.

A New Authoritative Dental Book

ELECTRO-RADIOGRAPHIC DIAGNOSIS

A Book on the Electric Test for Pulp Vitality, Giving the Technic of Its Use in Detail and Submitting Clinical Evidence of Its Absolute Necessity to Dental Diagnosis

By HOWARD R. RAPER, D.D.S., Formerly Professor of Radiodontia, Materia Medica and Operative Technic, and Junior Dean, Indiana Dental College; Author of "Elementary and Dental Radiography," etc.

160 pages, 6x9, with 135 illustrations. Price, silk cloth, ...$3.50

Condensed Table of Contents

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2. Pulp Testing Machines.
3. Requisites of a Pulp Testing Outfit.
4. Fundamentals in Technic of Applying Electric Test.
5. Special Points in Technic.
6. Things which Modify the Strength of Current Necessary to Test Teeth.
7. Limitations of the Test.
8. Applying the Test for Nervous Patients.
9. Answering Adverse Criticism.
10. Clinical Value of the Test.
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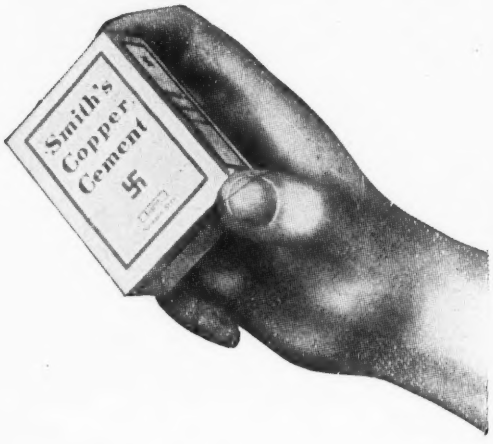

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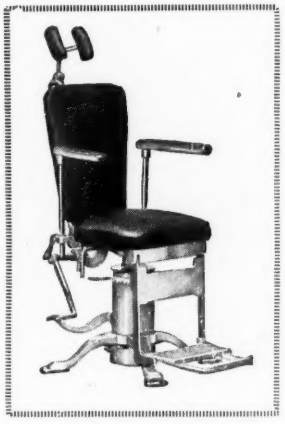

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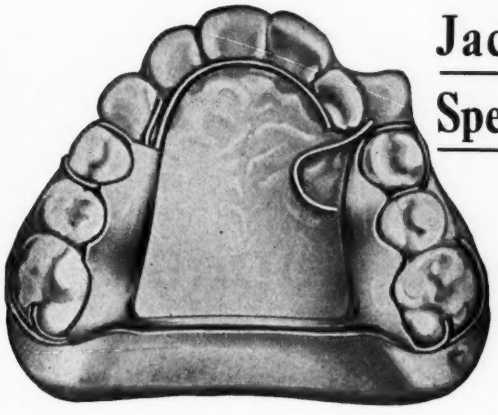

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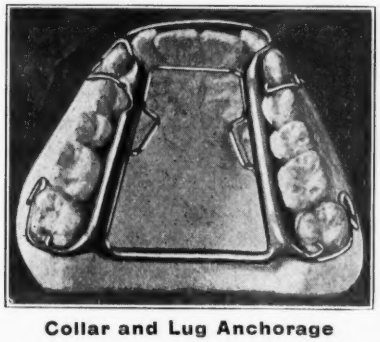

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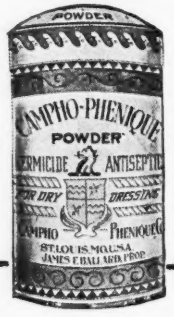

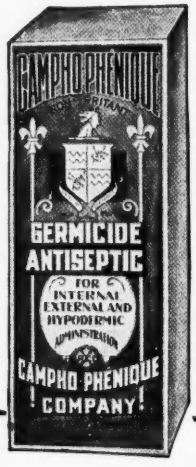

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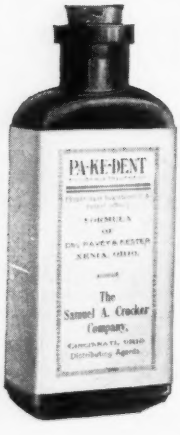

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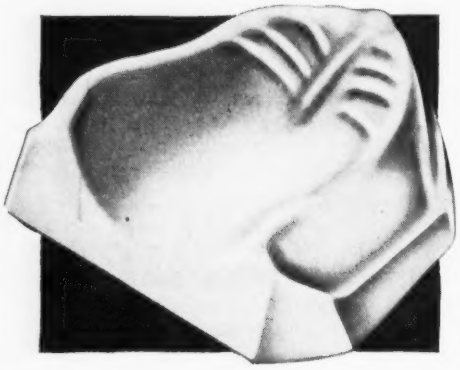

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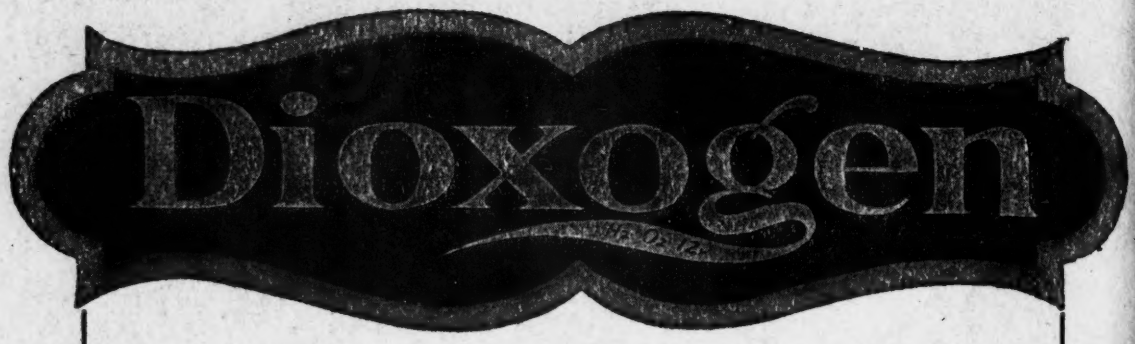

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